THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXV. No. 877.] LONDON, MARCH 2, 1880. [32nd Year.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

COOKE BROS.,
CENTRAL DEPÔTS:
CO. DONEGAL, IRELAND;
LONDON DEPÔT:
BLACKWALL, E.;
OFFICES:
26, 27, & 28, FENCHURCH ST.,
LONDON, E.C.

GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
Supplied, mixed ready for use, or in paste, as desired.
TORBAY PAINT COMPANY.
Proprietors: STEVENS & CO.,
21, GREAT WINCHESTER STREET, LONDON.
Works: BRIXHAM, TORBAY.

THOMAS PROUD,
BROOKFIELD GAS APPARATUS WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.
CONTRACTOR FOR
LAYING MAINS
FOR
Gas, Water, & Sanitary Purposes,
AND MANUFACTURER OF
WOOD GRIDS
FOR
SCRUBBERS AND PURIFIERS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL & CO.,
LIMITED,
Established at the commencement of Gas Lighting,
Manufacturers of
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
Head London Office:
145, QUEEN VICTORIA STREET.
ALMA TUBE-WORKS, WALSALL;
OLD PATENT TUBE-WORKS, WEDNESBURY.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNTS
PATENT COMPENSATING METERS
STREET-LAMPS, &c., &c.
Established 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
Manufacturers of
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
Sugar, Saltpetre, and all kinds of Pans.
Roofs, Girders, and Bridges, and General Smith's Work
London Offices: 97, CANNON STREET—
JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE.
See Page 310.

CROSSLEY BROTHERS,
MANCHESTER AND LONDON.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.
ESTABLISHED 1840.

CHANGE OF ADDRESS.
GEORGE GLOVER AND CO.,
DRY GAS-METER MANUFACTURERS,
HAVE REMOVED TO MORE EXTENSIVE PREMISES:

RANELAGH WORKS, ROYAL AVENUE, CHELSEA, LONDON, S.W.

WELLINGTON TUBE WORKS,

GREAT BRIDGE, TIPTON, STAFFORDSHIRE.

JOSEPH AIRD,

GAS, STEAM, AND HYDRAULIC TUBES AND FITTINGS.

NO MORE WASTE LIME! SAVE THE VALUABLE PRODUCT!

G. R. HISLOP'S PATENT REGENERATIVE PROCESS

Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

The process, in operation, may be seen at the Corporation Gas-Works, Paisley, where the Lime has been restored 120 times. Inspection is cordially invited.

For Terms, apply to GEO. R. HISLOP, F.C.S., Engineer, Gas-Works, PAISLEY, N.B.

ROBT. DEMPSTER & SONS,

GAS ENGINEERS, IRONFOUNDERS, AND CONTRACTORS,

ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.

MANUFACTURERS OF EVERY DESCRIPTION OF

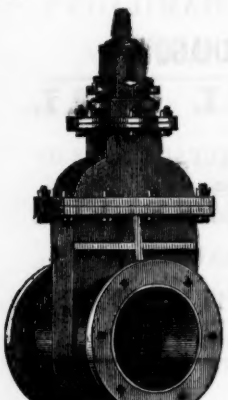
GAS APPARATUS;

CONTRACTORS FOR THE

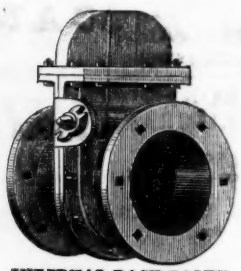
ERECTION OF PUBLIC AND PRIVATE GAS-WORKS.

Plans and Specifications Prepared, and Illustrated Catalogues forwarded on application.

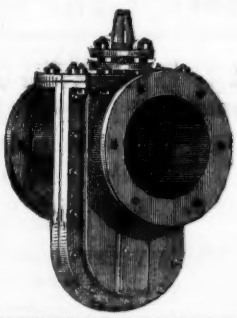
C. & W. WALKERS' GAS-VALVES.



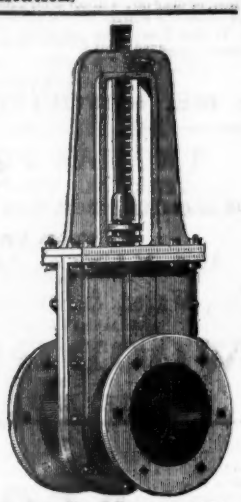
DOUBLE-FACED VALVE SPECIALLY FOR PURIFIERS.



INTERNAL RACK-VALVE WITH STEEL PINION, FOR GENERAL USE.



UNDERGROUND SCREW-VALVE FOR SHALLOW STREET-MAINS.



ORDINARY RACK AND PINION VALVE.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.,

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

LONDON OFFICES: 97, CANNON STREET—JAMES E. & SAMUEL SPENCER, AGENTS.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.

SAMUEL CUTLER & SONS,

CONTRACTORS FOR GAS & WATER WORKS, GENERAL ENGINEERS, IRONFOUNDERS & MANUFACTURERS OF

GASHOLDERS, TANKS, PURIFIERS,

SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

S. C. & SONS undertake the entire erection of New, or Remodelling of existing Gas-Works in any part of the World, including small Works for MANSIONS, FACTORIES, &c., or Works of the largest extent (are now constructing the largest Gasholder yet erected); also the supplying and laying of MAINS.

They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SIEVES for Purifiers and Scrubbers, of a superior make.

SPECIAL CASTINGS to Drawing or Pattern at Shortest Notice.

Manufacturers of MORRIS & CUTLER'S PATENT CONDENSER & CUTLER'S PATENT GAS-WASHER.

DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),

MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST-IRON TANKS FOR DITTO.

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS.

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

Drawings, Specifications, and Estimates supplied on application.

GAS PURIFICATION
BY
OXIDE OF IRON.
GAS PURIFICATION & CHEMICAL Co., LIMITED,
PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

GAS *v.* ELECTRIC LIGHT.
WIGHAM'S PATENT LIGHTHOUSE GAS-BURNERS,
For Street Lighting and the Illumination of Large Halls, Factories, Ship Yards, &c., where Powerful Light is required.

These Burners have been adopted by a School Board, having large school-rooms in charge, because of their high illuminating power and the facilities they give for perfect ventilation. The actinic power of these Burners is such that they are used successfully for Photography and Photo-Lithography.

SOLE MANUFACTURERS:

J. EDMUNDSON & CO., Gas Engineers, 19, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

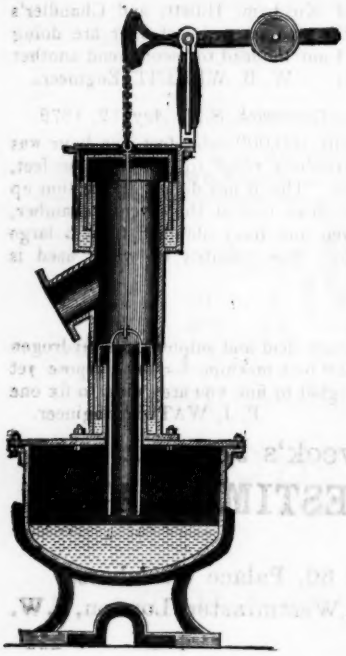
ALDER AND MACKAY,
MANUFACTURERS OF
IMPROVED WET AND DRY GAS-METERS
IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.

Original Manufacturers of Dry Meters in Cast-Iron Cases.

STATION-METERS, EXPERIMENTAL-METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

GRANGE WORKS, EDINBURGH.

SELF-ACTING REMOVABLE DIP-PIPE,
PATENTED BY
CHANDLER & STEVENSON.



The following Testimonials, as to five years constant working of this Patent Removable Dip, have been received:—

Metropolitan District Asylum Gas-Works, Caterham, Surrey, Jan. 15, 1874.

Messrs. CHANDLER and SONS.

DEAR SIRS,

In reply to your inquiries, I beg to inform you that since I have used your Patented Dips (ten in number), I find my make has increased over 1000 cubic feet per ton of coal carbonized, my usual make being 9070 cubic feet before using your Dips, and 10,150 cubic feet since using them.

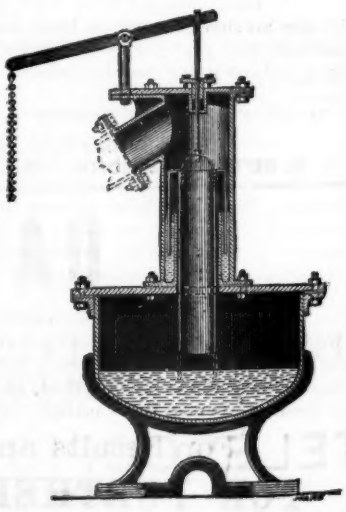
Metropolitan District Asylum Gas-Works, Caterham, Surrey, Dec. 30, 1879.

Messrs. CHANDLER and SONS.

DEAR SIRS,

In reply to your inquiry, it is with very much pleasure that I endorse every word of my letter of Jan. 15, 1874; and I may add that from the date the Patent Dips were fitted, they have worked perfectly, and there is very little carbon deposited in the retorts, in consequence of the lower pressure.

Yours faithfully,
(Signed) W. CRICKMAY,
Memb. Soc. Engineers.



APPLICATIONS TO BE MADE TO

Messrs. CHANDLER & SONS,

104, NEWINGTON CAUSEWAY, S.E.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

PATENT "STANDARD" WASHER-SCRUBBER,

FOR

GAS PURIFICATION,

TAKES OUT EVERY TRACE OF AMMONIA AND A LARGE QUANTITY OF CARBONIC ACID AND SULPHURETTED HYDROGEN BY ONCE PASSING THROUGH THE MACHINE.

AMMONIACAL LIQUOR OBTAINED OF ANY REQUIRED STRENGTH.

The Cost of the Machine defrayed by the Ammonia obtained in Twelve Months.

It requires very little attention, and cannot get out of order.

THESE MACHINES HAVE BEEN SUPPLIED TO THE FOLLOWING GAS-WORKS:—

	Feet per Day.
The Gaslight Company, London—	
Beckton	5,000,000
Bromley	7,000,000
St. Pancras	3,000,000
Bradford Corporation	1,000,000
Bremen	150,000
Buxton Local Board	250,000
Dukinfield Local Board	500,000
Driffield Company	100,000
Goole Company	250,000
Glossop Company	300,000
Holywood Company	125,000
Heywood Local Board	600,000
Leeds Corporation	2,000,000
Leominster Company	150,000
Maidstone Company	1,000,000
Phœnix Company, Greenwich	2,500,000
" " Vauxhall	3,000,000
Woolwich Equitable Company	400,000
Yeadon Company	500,000

AND MANY OTHERS ARE IN COURSE OF CONSTRUCTION.

TESTIMONIALS.

Messrs. KIRKHAM, HULETT, and CHANDLER. *Engine-Works, Millbank, Westminster, S.W., March* 5, 1879.

Gentlemen,—In accordance with your instructions, I have taken diagrams from Vertical Engine driving your Patent Horizontal Washer-Scrubber to purify 60,000 feet of gas per hour on the works of The Gaslight Company at King's Cross, and find the following results, viz.:—

Horse power required to drive engine, shafting, and gearing alone	= 0·398
Total horse power with washer on	= 1·721
Absolute horse power required to drive Washer-Scrubber	= 1·323

(Signed) THOS. HORN.

Messrs. KIRKHAM and HERSEY. *The Gaslight and Coke Company, Bromley-by-Bow, E., June* 2, 1879.

Gentlemen,—I have much pleasure in stating that the results of the working of Kirkham, Hulett, and Chandler's Washer-Scrubber, erected at these works in 1877, have been perfectly satisfactory, and that the two erected last year are doing well—all that you guaranteed; indeed, the effectiveness of the machine is so convincing, that I am induced to recommend another being ordered if you can undertake to have it erected complete before next winter. (Signed) W. B. WRIGHT, Engineer.

Messrs. KIRKHAM and HERSEY. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Aug.* 12, 1879.

Gentlemen,—In reply to your inquiry, one of your Patent Scrubber-Washers to purify 100,000 cubic feet per hour was put into operation at these works on the 1st of June. At the same moment the whole of our Scrubbers, equal to 28,000 cubic feet, were thrown out of use, leaving your Washer the whole work of freeing the gas from Ammonia. This it has done to perfection up to date. With 10 gallons of water to each ton of coal carbonized passing through it we get a clean test at the seventh chamber, leaving four chambers margin for extra work. The mean quantity of Ammonia in the inlet (fixed and free) obtained from a large number of tests was 241 grains per 100 feet of gas. On the outlet—Free Ammonia—Nil. The quantity of water used is 10 gallons per ton of coal carbonized. The strength of liquor as follows:—

Chamber No.	1	2	3	4	5	6	7	8	9	10	11
Strength of liquor—ounces	Nil.	Nil.	Nil.	Nil.	0·4	1·0	2·2	3·5	5·5	8·25	12·5

We are working five revolutions per minute. It takes out all the free Ammonia, reduces the carbonic acid and sulphuretted hydrogen 30 per cent., requires a very small amount of power to drive, and altogether is, in my opinion, the best machine for the purpose yet invented, and will, I feel confident, ere long, entirely supersede the Scrubbers of to-day. I am glad to find you are going to fix one of these Washers at our Vauxhall works. (Signed) P. J. WATES, Engineer.

For Results and other Testimonials, see next week's Journal.

FOR FURTHER PARTICULARS AND TESTIMONIALS, ADDRESS MESSRS.

KIRKHAM, HULETT, & CHANDLER, LIMITED, { 59 & 60, Palace Chambers, Bridge St., Westminster, London, S.W.

AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.

Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877,)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. SIZES { NOMINAL HORSE POWER ½ 1 2 3½ 6 8 12 16 / MAXIMUM HORSE POWER ¾ 1½ 2½ 4 9 12 18 24 } OFFERED. CASES NOT CHARGED IF RETURNED FREE.

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

WORKS AND HEAD OFFICES: Gt. Marlbro' St., Gloster St.

CROSSLEY BROTHERS, MANCHESTER.

LONDON HOUSE: 116, Queen Victoria St., E.C.

THE NEW GAS COOKER.

40 PER CENT. OF GAS SAVED.

No. A510 same as our **No. A152,**
BUT LINED WITH PATENT NON-CONDUCTOR.
Will Roast, Bake, and Fry, and with Three Burners for Boiling.

SIZE.
Outside—30in. high, 20in. wide, 20in. deep.
Inside—19½in. „ 14in. „ 17in. „

Price . . . . . £4 14s. 6d.

No. A500.
LINED WITH PATENT NON-CONDUCTOR.
Is fitted with Roasting and Baking Oven and Four Burners for Boiling.

SIZE.
Outside—34in high, 20in. wide, 19in. deep.
Inside—30in. „ 16in. „ 17in. „
Hot Plate—24in. by 23in.

Price . . . . . £7 10s. 0d.

No. A505.
Same as with Roasting and Baking Oven, a Broiler or Toaster, a Chop Griller, a Hot Water Boiler, and Three Burners for Boiling.
Hot Plate—26in. by 24in.

Price . . . . . £9 15s. 0d.

These Cookers are jacketed, on the sides, top, and door, with a new and very efficient non-conducting material, by the use of which a **saving** of gas to the extent of **40 per cent.** is effected.

Gas Companies who are selling or hiring stoves should see these stoves. Catalogues and particulars on application to

JOHN WRIGHT & CO., ESSEX WORKS, BROAD STREET, BIRMINGHAM.

London Warehouses: { 155a, Upper Thames Street, / 1, Little Bush Lane.

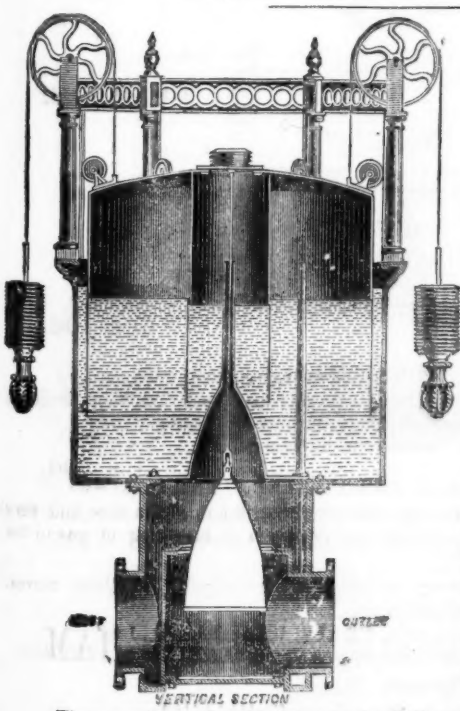
EDWARD BROOKE AND SONS,
FIELDHOUSE FIRE-CLAY WORKS, HUDDERSFIELD,
MANUFACTURERS OF
GAS-RETORTS, FIRE-BRICKS, &c.,
Which have been extensively used for 30 years in the construction of Glass Furnaces, where the heat is five times greater than in Gas Ovens; superior to any Retorts or Fire-bricks in the market for standing intense heats, and not contracting.

JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

J. & H. ROBUS,
BUILDERS AND CONTRACTORS
FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,
RETORT-SETTING—A SPÉCIALITÉ.
ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.
ESTIMATES GIVEN FOR MAIN-LAYING.
N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.
Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

J. & J. BRADDOCK,
GLOBE METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY CONSUMERS GAS-METERS,
OF THE HIGHEST EXCELLENCE ONLY;
ROUND STATION-METERS,
ON CAST-IRON STANDS;
SQUARE STATION-METERS,
WITH PLANED JOINTS.
Messrs. BRADDOCK beg to submit to Gas Engineers their
PATENT COMPENSATING GAS GOVERNOR,
Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 30-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,
Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.
MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
FINSBURY CIRCUS, LONDON.

MOBBERLEY & PERRY,
FIRE CLAY and BRICK WORKS,
STOURBRIDGE.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAY.
Manufacturers for Home and Export,
GAS-RETORTS, GLASS-HOUSE FURNACE,
BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

ESTABLISHED IN 1860.
BENJAMIN CARPENTER,
THE ORIGINAL MANUFACTURER OF THE IMPROVED
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.
PROVIDENCE WORKS,
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

The Dunston Engine Works Co.,
GATESHEAD-UPON-TYNE.
Are the Sole Manufacturers of
Archer's Patent Hoists,
ALSO OF
Archer's Patent Stone Breaker,
AND OF
Archer's Patent Ore Crusher & Pulveriser,
The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

"TANNIC GELATINE,"
FOR
REMOVING AND PREVENTING INCRUSTATION OF EVERY DESCRIPTION OF STEAM BOILERS; ALSO CORROSION.
Manufactured only by
WILLIAM RICHARDSON,
GAS ENGINEER,
94, CHARLES HENRY STREET, BIRMINGHAM.

Gold Medal Awarded, Paris Exhibition, 1878.
THOMAS TURTON AND SONS,
SHEAF AND SPRING WORKS,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS,
STEEL OF ALL DESCRIPTIONS,
SCREW STOCKS, TAPS, AND DIES, SPANNERS,
RATCHET BRACES, LIFTING-JACKS,
ANVILS, VICES,
AND ENGINEERS TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

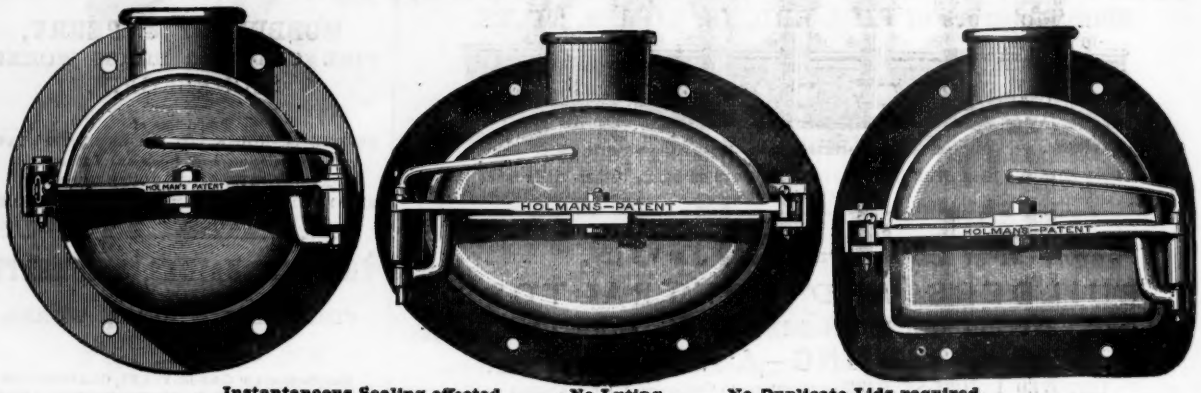
TANGYE BROTHERS AND HOLMAN,

CORNWALL HOUSE, QUEEN VICTORIA STREET, LONDON, E.C.

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and Self-Sustaining Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Morton's Patent Retort-Lids are in use in nearly all the Principal Gas-Works in the United Kingdom and the Colonies; also on the Continent and in the United States of America. They are now made of the

SAME FORM OR SECTION AS THE RETORT. (See Illustrations above.)

Engineers preparing Specifications of New Works will be furnished with Dimensions of Stock Patterns, together with Approximate Weight and other data on application.

HUNT'S
EQUILIBRIUM DIRECT-MAIN GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight & Coke Co. (19), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Leicester, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

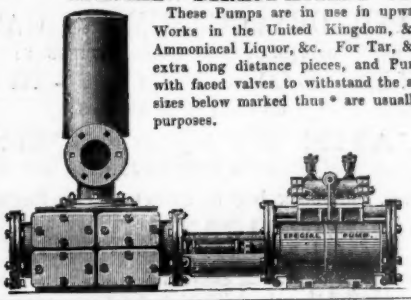
MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

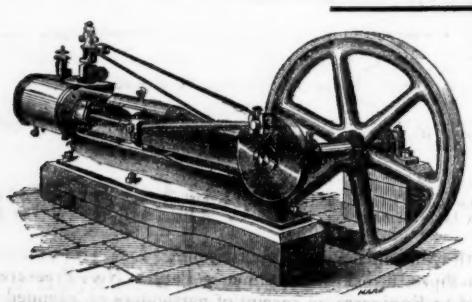
THE
"SPECIAL" DIRECT-ACTING STEAM-PUMP.

These Pumps are in use in upwards of one hundred Gas-Works in the United Kingdom, &c., pumping Water, Tar, Ammoniacal Liquor, &c. For Tar, &c., they are provided with extra long distance pieces, and Pumps are entirely of iron, with faced valves to withstand the action of the liquid. The sizes below marked thus * are usually kept in stock for these purposes.



The quantities delivered of Tar should be taken about two-thirds that of water.

Diameter of Steam Cylndr.	Diameter of Water Cylndr.	Length of Stroke.	Gals. of Water per Hour, Approx.	Prices for Water.	Prices for Tar and Ammoniacal Liqr.
*3 in.	1¼ in.	9 in.	450	£16 0 0	£17 0 0
*4 ,,	2 ,,	9 ,,	815	18 0 0	19 0 0
*5 ,,	2¾ ,,	12 ,,	1,250	21 0 0	22 10 0
*5 ,,	3 ,,	12 ,,	1,830	22 10 0	24 0 0
*6 ,,	3 ,,	12 ,,	1,830	25 0 0	26 10 0
*6 ,,	4 ,,	12 ,,	3,250	30 0 0	31 10 0
6 ,,	5 ,,	12 ,,	5,070	35 0 0	36 10 0
*7 ,,	5 ,,	13 ,,	5,070	40 0 0	41 10 0
7 ,,	6 ,,	13 ,,	7,330	45 0 0	46 10 0
*8 ,,	6 ,,	13 ,,	7,330	50 0 0	52 0 0
10 ,,	6 ,,	12 ,,	7,330	60 0 0	62 10 0
10 ,,	8 ,,	12 ,,	13,000	75 0 0	77 10 0



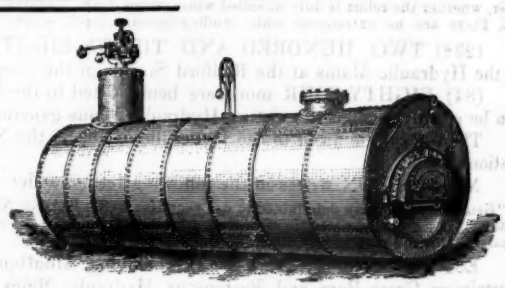
TANGYE'S HIGH-PRESSURE STEAM-ENGINE,

NEARLY 4000 IN USE.

The Design, Workmanship, and low prices of these Engines have called forth universal approval.

Nom. H.P.	2	3	4	6	8	10	12	14	20	25
	£28	£37	£44	£68	£86	£111	£122	£133	£185	£215

Including Governor and Feed Pump. Variable Expansion extra.



CORNISH, LANCASHIRE, "THE KESTERTON," VERTICAL, AND MULTITUBULAR STEAM-BOILERS OF SUPERIOR QUALITY ALWAYS IN STOCK.

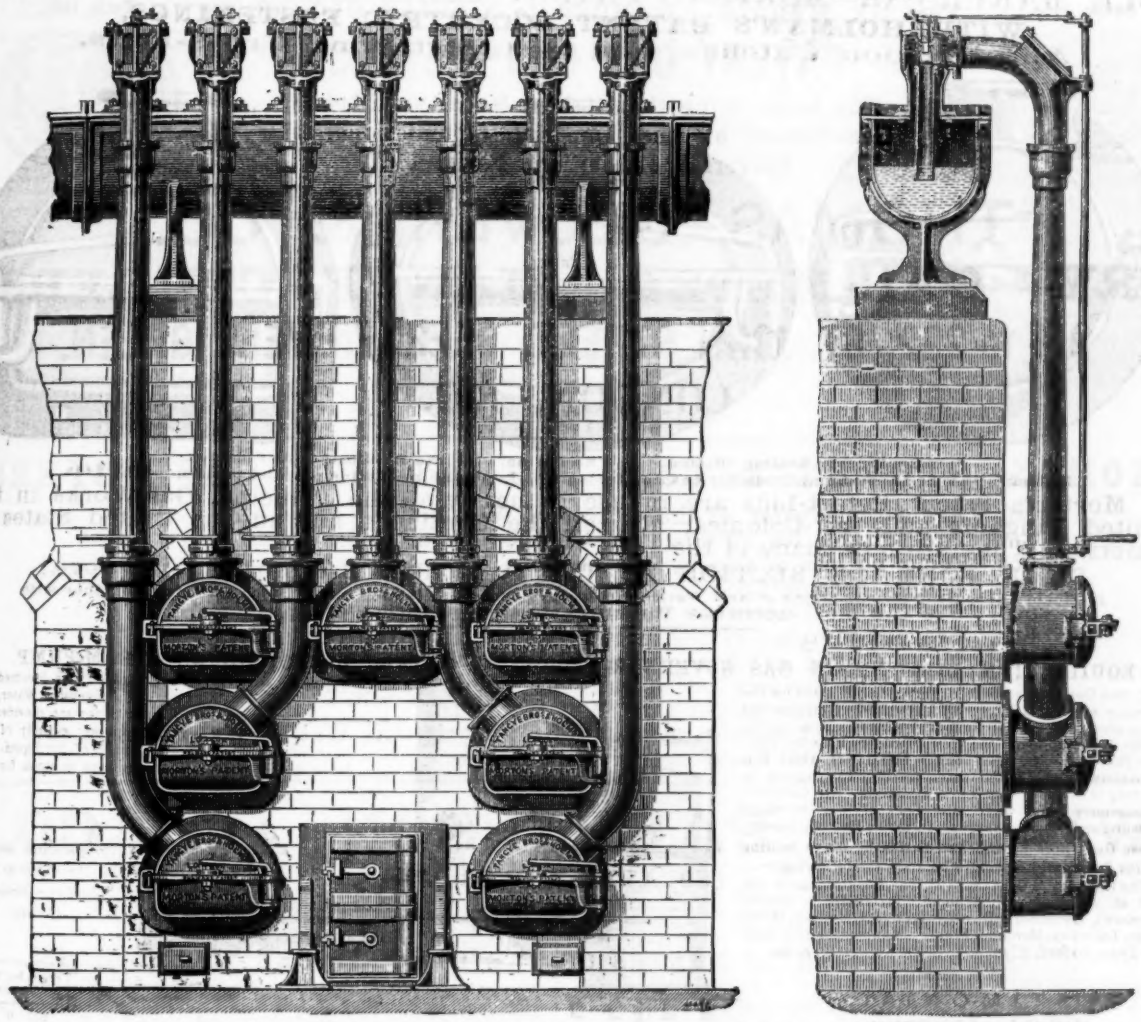
This Department having been greatly extended and furnished with the most approved Boiler-making Machinery and Tools, T. B. & H. are prepared to supply all kinds of Steam-Boilers with great facility at lowest current prices.

Also Makers of IMPROVED HYDRAULIC HOISTS, TRAVELLERS, CRABS, CRANES, PULLEY BLOCKS, HYDRAULIC AND SCREW LIFTING JACKS, LATHES, PUNCHING AND SHEARING MACHINES,

And all other Descriptions of Tools, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, &c., ON APPLICATION.

HOLMAN'S PATENT
NON-PRESSURE VALVULAR SEAL-PIPES
FOR
HYDRAULIC MAINS.



The salient features of the above arrangement are as follows:—

1. The Seal is instantaneously opened and closed from the stage by the stokers.
2. There are only two positions for the actuating lever: one when the Seal is opened during the period of carbonization, the other when it is closed for drawing and charging the retort.
3. The retort can never be blocked, beause the port directing the gas *through* the Seal is always opened, and the port permitting the gas to *pass* the Seal *direct* into the hydraulic main is also open while the retort is at work.
4. The manager and stokers can always see at a glance, by the position of the lever, whether the retort is duly unsealed while carbonizing its charge.
5. There are no extraneous seals, stuffing-boxes, hinges, screws, chains, pulleys, springs, teeth, or other complication belonging to the valves; they are made plain and strong for rough use, and will last many years without renewal.
6. The valve faces are always covered and never separated, hence no foreign matter can put them out of action.
7. They are positive, reliable, interchangeable, free from all the uncertainty of automatic arrangements, and low in price.
8. No extra pipes or connections are required, because the Valvular Seal-pipe is self-contained in the single branch of the ascension-pipe, which stands on the hydraulic main, and is easily accessible by removing an ordinary cover secured by two bolts only.

(238) TWO HUNDRED AND THIRTY-EIGHT HOLMAN'S PATENT VALVULAR SEAL-PIPES are being fitted to the Hydraulic Mains at the Radford Station of the Corporation Gas-Works at Nottingham.

(84) EIGHTY-FOUR more are being fitted to the Mains in the New Retort-House of the Gas-Works at Brentford, and they can be readily applied to existing Hydraulic Mains generally.

They are to be fitted to the Hydraulic Mains of the New Retort-House at the LONDON GAS-WORKS, and at other large stations.

Mr. MORTON writes in the following terms, under date of Feb. 3, 1880:—

"Gentlemen,—I have determined to use your HOLMAN'S PATENT NON-PRESSURE VALVULAR SEAL PIPES in our new Retort-House. Will you, in the meantime, send me, as soon as you can, four as you are now making them. I expect to hear of a large demand for these Pipes. I like the idea of always maintaining a passage through an ordinary dip."

ESTIMATES for Retort Work, including Mouthpieces fitted with Morton's Patent Self-Sealing Lids and Holman's Self-Sustaining Cross-Bars and Fastenings, Hydraulic Mains and Ascension-Pipes, fitted with Holman's Patent Non-Pressure Valvular Seal-Pipes complete (as per accompanying illustration), will be forwarded to Engineers on receipt of particulars of intended erections, or re-setting of Retorts during the current or ensuing season.

Engineers preparing Specifications will be furnished with Tracings and all necessary data on application.

Sole Makers:

TANGYE BROTHERS AND HOLMAN,
HYDRAULIC AND GAS ENGINEERS,
CORNWALL HOUSE, QUEEN VICTORIA STREET, LONDON, E.C.

London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

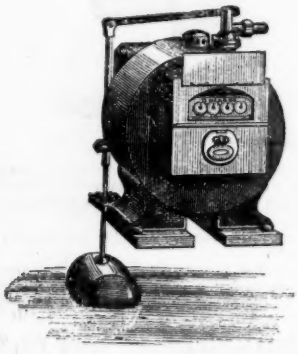
LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816.)



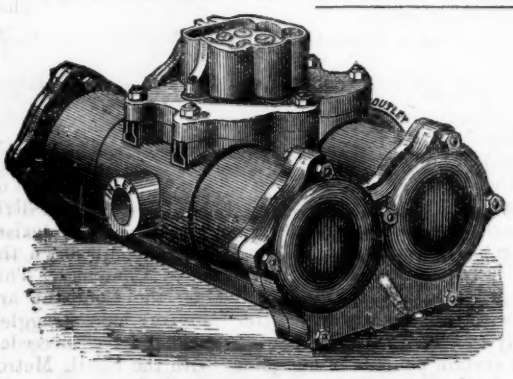
SOLE MAKERS OF THE LOW-PRESSURE WATER-METER.

This Meter will register with perfect accuracy, either at full speed, or with a few drops only passing through it.

It must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below.

Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply at the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



HIGH-PRESSURE WATER-METER.

The Union Water-Meter, of which an external view is here given, is of the positive class—*i.e.*, a Meter in which a measuring chamber is alternately filled and emptied, each filling being duly recorded. It is formed of two cylinders, with double pistons in each, having a rotary-valve of peculiar construction, which is worked from cams on the piston-rods.

It is claimed for this Meter, among its advantages over other Piston Meters in use, that it is extremely small and compact, and that its durability and accuracy have been proved by the fact that upwards of 20,000 of them, of various sizes, are in successful operation in the States. In England the instrument has been fully tested by several Water Engineers of eminence, and pronounced by them as a reliable and satisfactory register of water supply; it is also economical in cost.

ALL METERS are TESTED with 60 lbs. pressure before they are sent out.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

CONTENTS.

PAGE

Circular to Gas Companies:—
The Scheme for the Amalgamation of the South Metropolitan and Phœnix Gas Companies . . . 315
Gas Affairs at Stone . . . 316
The Gas Question at Hanley . . . 316
The Gas Question at Norwich . . . 316
The Meeting of the Wakefield Gas Company . . . 316
Affairs of the Croydon Commercial Gas Company . . . 316
The Prescot Gas Company and the Local Board . . . 316
The Maidstone Town Council and the Gas Company . . . 316
Pintsch's Light at Sea . . . 316

Water and Sanitary Notes:—
The Government and the Metropolitan Water Supply . . . 317
The Liverpool Corporation (Vyrnwy) Water Scheme . . . 317
Proposed Public Audit of the Water Accounts of the Liverpool Corporation . . . 317
Liverpool and its Refuse . . . 317
The Meeting of the Colne Valley Water Company . . . 317
Purchase of the Colchester Water-Works by the Corporation . . . 317

Leading Article:—
Urban Water Supply . . . 318

Communicated Article:—
The Corrosion of Iron. By Mr. William Foster, M.A. . . . 319

Correspondence:—
Meter-Rents . . . 320
The Gas Referees Sulphur Test . . . 320
Frozen Lamp Services . . . 320

Parliamentary Intelligence:—
Private Bills Relating to Gas, Water, &c. . . . 321
House of Commons—
The Government and the Metropolitan Water Supply . . . 322
National Water Supply . . . 322
Liverpool Corporation Water Bill . . . 322

Legal Intelligence:—
High Court of Justice—Exchequer Division—Tatton v. The Staffordshire Potteries Water-Works Company . . . 323
Swindon Police Court—Charge of Forgery, Embezzlement, and Fraud by a Gas-Works Manager . . . 323

Miscellaneous News:—
The Purchase of the Colchester Water-Works . . . 317
Belper Gas Company . . . 317
The Gas Supply of Long Eaton . . . 317
Barnsley Gas Company . . . 323
On the Quantity and Quality of the Water supplied to London during 1879. By C. M. Tidy, M.B. . . . 324
The Liverpool Corporation (Vyrnwy) Water Scheme . . . 325
Manchester District Institution of Gas Engineers . . . 325
Meeting of the Wakefield Gas Company . . . 325
Aldershot Gas and Water Company . . . 325
Meeting of the South Shields Gas Company . . . 326
Meeting of the Peterborough Gas Company . . . 326
Meeting of the Newport (Mon.) Gas Company . . . 327
Meeting of the Sunderland and South Shields Water Company . . . 327
Meeting of the Chatham and Rochester Water-Works Company . . . 327
Meeting of the Colne Valley Water Company . . . 328
The Gas Supply of Cork . . . 328
Newbury Town Council Gas Supply . . . 328
The Proposed Acquisition of the Abersychan and Pontypool Gas and Water Works by the Local Authorities . . . 329
Completion of the Extensions at the Macclesfield Corporation Gas-Works . . . 329
The Gas Supply of Stone . . . 329
Spence's Metallic Compound and its Use for Pipe-Joints . . . 331
Recent Sales of Gas and Water Stock . . . 332
Alarming Fire at the Dunfermline Gas-Works . . . 332
Trade Reports . . . 332
Wells (Somerset) Water Company . . . 333
Ripley Gas Company . . . 333
The Water Supply of Clay Cross . . . 333
Ruthin Water Company . . . 333
Grantham Gas Company . . . 333

Share List of Gas and Water Companies . . . 333

TO CORRESPONDENTS.

We are obliged to hold over till next week the reports of several gas companies meetings, which have been forwarded to us; as well as communications that arrived too late for notice to-day.

F. D.—*We think you have misunderstood the remarks of the gentleman you mention. We are, however, obliged to you for calling attention to them.*

A MEMBER OF "B. A. G. M.," AND SUBSCRIBER TO ITS BENEVOLENT FUND.—*The Secretary of the Company was right in regarding a letter sent him, under the circumstances you name, as a private communication not to be given over to you.*

G. WARREN DRESSER, New York.—*Thanks for pamphlet received, "Report on the Topophone and the Electric Light." By Professor Henry Morton, Member of the Lighthouse Board; being the Appendix to the Annual Report of the Board for the Year ending June 30, 1879; Washington, 1880.*

RECEIVED.—*"Lightning Conductors, their History, Nature, and Mode of Application." By Richard Anderson, F.C.S., &c. London: E. and F. N. Spon.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 2, 1880.

Circular to Gas Companies.

WE had some hopes that the scheme for the amalgamation of the Phœnix and South Metropolitan Gas Companies would have been confirmed at the Privy Council held on Thursday last. This, however, was not the case. The matter still stands over, and now we have rumours that the last amended scheme has been altered and put into the shape in which it is to be presented to Her Majesty in Council. So far as we can learn, the difference between the last "amended" scheme and this final document are not very great. We know how averse some people are to the payment of Directors, no matter how much their services may be required, and therefore we are not surprised to learn that under the scheme the Board of Trade have cut down the number of these functionaries from twelve to ten, the number to be ultimately reduced to eight. The remuneration of these Directors is, we believe, not to exceed £400 per annum each, and those retiring will only be entitled to seven years purchase of their emoluments. So far as the capital arrangements are concerned, we understand that these will remain the same as settled in the last "amended" scheme. Why this business has hung so long on the hands of the Board of Trade we cannot imagine. All that has been done might have been easily settled within a week or a fortnight, and yet the two Gas Companies concerned have been kept on tenter-hooks, and have had to make innumerable journeys to Whitehall Gardens, only to be told that everything was settled, when something turned up to unsettle the arrangements. We may be thankful that, if what we hear be true, the Companies will henceforth be free from any other interference from the Board. There is, it is said, "many a slip between the cup and "the lip," and it may be that this last and, as reported, finally settled and irrevocable scheme will be withdrawn for further consideration. The Metropolitan Board of Works have not yet approved of it, but have referred it to their Works and General Purposes Committee to report thereon. We cannot imagine that anything the Metropolitan Board may say on this matter will influence the Board of Trade in their action; but, as unlikely things do sometimes happen, we cannot feel certain, even now, that the scheme is definitely arranged.

We object to these delays, on account of the present position of the two amalgamating Companies, who have, each of them, a Bill before Parliament. That of the Phœnix Company has not yet passed the Examiners, and we may be excused in expressing a hope that it never will. The Bill of the South Metropolitan Company, which, in its essential provisions, is identical with that of the Phœnix, has passed the first reading, and will, no doubt, go forward—that is, if a speedy dissolution does not put off for a time all private parliamentary business. On this account we cannot help thinking that the unnecessary delay of the Board of Trade has acted prejudicially to the interests of the Companies concerned. Supposing the scheme had been confirmed, the Bill of the South Metropolitan Company might have gone forward, and by this time almost have passed the Commons. There is really no opposition to it, except from the Metropolitan Board of Works, who are anxious to cut down the initial price from 3s. 6d. to 3s. The Lambeth Vestry protest against the acquisition of land at Greenwich for the erection of new works; but opposition of this kind will only afford food for laughter. Lambeth is not at all likely to be annoyed by gas-works at the far end of Greenwich, and probably no one will pay the smallest attention to opposition of this kind. If the members of the Vestry are really serious in their opposition, we would recommend them to engage, if they can, the services of Sir E. Beckett, Q.C., Mr. Venables, Q.C., and Mr. Pope, Q.C., and when these gentlemen have exhausted their eloquence, cheerfully pay the surcharges that will be made by the Auditor.

It remains to say a few words on the question of initial price. When the sliding scale was adopted, it was understood that the Gas Companies would have a fair margin of profit, if they could make it at the initial price, while higher dividends might be secured if the price were brought below the standard. Now that circumstances place the Companies in a position to make additional profits by reduced prices, a cry is immediately raised that the standard must be lowered. The fact is altogether overlooked that the sliding scale works upwards and downwards. Just at present the Gas Companies, with low-priced coal, are making good profits; but the cost of the raw material is rising day by day, so that in the course of a year or so we may find the price of gas raised, and the dividends will thus be reduced. It would, then, under existing circumstances, be extremely unfair to pull down the initial price of the South Metropolitan Company. This would fall with greater hardship when the Company are united with the Phœnix. The latter Company have struggled manfully to keep down the price of gas, and have succeeded up to a certain point. When joined with the South Metropolitan, further concessions must necessarily be made to the consumers in the Phœnix Company's district. The effect of a reduction must inevitably be felt by the South Metropolitan Company when the scheme is brought into full operation, though we do not anticipate that any directly evil results to the Company will follow from the combination. The "A"

shares will, of course, continue to receive the enhanced dividends to which they are entitled under the schemes of amalgamation, and can only suffer in common with others. We are no alarmists, but we feel bound to protest against the continued attempts to depreciate the value of gas property. When the Bill of the South Metropolitan Company comes before a Committee of the House of Commons, we shall hear all that the Metropolitan Board have to allege in support of a reduced initial price. We venture to assert, however, that nothing will be brought forward which will satisfy a Committee that any change should be made in the standard price fixed by the Committee of 1876. If any change be made, we are satisfied that it will be in an upward direction; and but for the fact that the South Metropolitan Company have not applied for it, we think it not unlikely that the price asked for by the Phœnix Company—viz., 3s. 9d. per thousand feet—might have been granted. It is useless, however, to speculate now. The amalgamation scheme is, we understand, virtually sanctioned; the Bill of the South Metropolitan Company will go forward, and that of the Phœnix Company be dropped, and there, for the present, the matter ends.

A Local Government Board Inquiry has been held at Stone, the Local Authority of which wished to obtain power to set up gas-works. Now there is already at Stone a Company supplying excellent gas at a very moderate price, but the Company is non-statutory; hence, of course, it offers points of attack which could not be made if it were under parliamentary authority. For instance, the Company are charged with making enormous profits, and applying revenue to extensions; and this they have a perfect right to do. The Local Board have been long anxious to purchase the undertaking, but could never arrange terms with the Gas Company, who asked £20,000 for their undertaking, and refused to take a less sum. As a consequence, the Local Board determined to apply for powers to set up competing works, and hence the inquiry we notice. There can be no doubt that it would be quite within the power of the Local Board to erect gas-works if they could obtain the money; but it was explained to them that a place like Stone could not support two works. One or the other, if not both, must prove unsuccessful, and most likely that of the Local Board would suffer most in the course of a competition. However, all thought of competition has been dissipated by the expressed opinion of the Inspector that power to raise a loan would not be granted. At the same time he appears to have seen that the Company had made large profits, and were under no legal restrictions. He therefore obtained from the Chairman of the Company a promise that next year they would go to Parliament for an Act of Incorporation, and so place themselves under all the usual limitations imposed by modern gas legislation.

A sparsely-attended meeting of owners and ratepayers, under the Borough Funds Act, 1872, was recently held at Hanley, to authorize the Corporation to expend the rates in opposing the Bill of the British Gaslight Company now before Parliament, which is to empower the Company to expend a sum of £75,000 on their Staffordshire Potteries undertaking. The allegation of the Corporation is that this £75,000, which the Company have in hand, and only wish for power to expend, is, in reality, accumulated profits, which should have been applied to a reduction of the price of gas. But gas is not dear at Hanley, and the Company have made several reductions. The price now charged is 5s. per thousand feet, with a discount of tenpence per thousand for prompt payment, making the net price 4s. 2d., and even less to large consumers. Of course, one object of the Town Council, as we have previously mentioned, is to gain possession of the undertaking, which the Company absolutely and positively refuse to sell. The Bill promoted by the Company has been read a second time, and will soon be in committee, and then we shall find how the land lies.

It is a curious thing that the Corporation of Norwich, who have a standing feud with the British Company, never quote the case of Hanley. They make all they can of the difference in price between Hull and Norwich, but they say nothing of Hanley, in which the conditions more nearly resemble those of Norwich. The last step taken by the Norwich Town Council has been to obtain a report from their Parliamentary and Bye-laws Committee on the gas supply of Norwich as compared with other places; but the Committee seem to have avoided all comparison with Hanley. It has been clearly explained to them why gas can be supplied so much cheaper at Hull than in Norwich; but the Norwich Corporation will not accept the explanation. They must, however, admit that they are in nowise worse off than the Corporation of Hanley, who make no direct reference to Hull. We shall be very glad when these everlasting squabbles with the British Company are ended. We believe that the Company can hold their own against all opponents, and the proceedings which will be presently commenced before a Committee of the House of Lords, in the case of the Staffordshire Potteries Bill of the Company, will, we expect, demonstrate that the Company are acting quite within their powers, and in reality in the interests of their customers.

The Wakefield Gas Company are, we may say, as remarked above, reaping the advantages of the sliding scale. They pay for the past half year a dividend of eleven per cent., and, after that, carry the large balance of £1258 to the reserve-fund, which now amounts to £6515. The quality of the gas supplied is exceedingly well maintained, and no complaints of any kind are heard against the Company.

The Croydon Commercial Gas and Coke Company are doing exceedingly well under the sliding scale. The profits that they made at the reduced price of gas during last year enable them to pay a dividend of twelve per cent. on their original, and nine per cent. on their additional capital for the past half year. The Directors report and accounts for the six months have been issued in anticipation of the meeting to be held to-morrow. The report sets forth what we have said above; but beyond this, and an account of the construction of some new gasholders, it possesses no features of interest. It stands to reason that the stock of a Company so prosperous should command a high price in the market, and accordingly last week at a sale of £5 shares, which, of course, have been fully paid up, each share entitled to ten per cent. realized, on the average, £11 7s. 6d., while the others, entitled to only seven per cent., brought £8 7s. 6d. Who can say, after this, that gas property is depreciated in value? The records of the Stock Exchange bear witness that the shares in the London Gas Companies fully maintain their value, and in the case of the South Metropolitan Company rise in worth. The last quotations, indeed, show that the South Metropolitan Company's shares have risen to an extent which we must regard as something more than their worth. "Hope springs "eternal in the human breast," and it may be that the purchasers of these gas shares expect that imminent combinations will enable the Company to pay even larger dividends than at present.

We are happy to say that an understanding has been come to between the Prescot Gas Company and the Local Board, by virtue of which all opposition to the Company's Bill now in Parliament will be saved. The question in dispute was one more of price than quality, and accordingly we find it settled that the price shall range between 5s. 10d. and 5s. 4d. per thousand feet, according to the total sale of gas by the Company, with a reduction of ten per cent. for prompt payment. Thus one more parliamentary contest is avoided.

The second meeting of the Town Council of Maidstone, under the Borough Funds Act, has been held, and it now only remains for a town's meeting to give their sanction to the opposition by the Town Council to the Bill of the Gas Company now before Parliament. The opposition is, perhaps, hardly justified, for the Maidstone Gas Company have always supplied gas of good illuminating power. With respect to sulphur, it may, at times, have been what some would call in excess; but when the Company's plant is enlarged, all this will be made right. As regards what should be the initial price under the new Act, that must be arranged before Committee. We cannot think 4s. per thousand feet too high for Maidstone, but we have no doubt that others may regard it as excessive.

Pintsch's light is receiving extended application in the lighting of buoys, and continues to meet with approval. The light placed on the Shoals Rock in the Firth of Clyde is voted a great success, and now we read of a proposal to place a series of these lights between Glasgow and Greenock, which will give the river the appearance of an illuminated street, and allow the steam traffic to be carried on by night with as much safety as it is by day. We have, on a previous occasion, remarked on the wastefulness of the Pintsch system, by which it is necessary to keep the light burning continuously during the twenty-four hours. We recommended an automatic apparatus for lowering the light in the daytime, and turning it on full for the dark hours; but really, if what we now read be substantiated, economy of this kind is needless, for it is said that the light of the buoy costs only threepence per day of twenty-four hours. We feel bound, however, to remark once more that if the lights be no better than those supplied to railway-carriages, they can be of very little use to the mariner threading his way on a dark night up the Clyde. Still it is a triumph for gas; but we may express a hope that it will soon be eclipsed.

Water and Sanitary Notes.

Mr. Fawcett sticks to the Home Secretary with great pertinacity. Last evening he again wanted to know from Mr. Cross when the Bill relating to the Water Supply of London would be introduced. For answer, he received the assurance of the Home Secretary that he would ask permission of the House to bring in the Bill and make a statement this evening, promising Mr. Fawcett that if the Bill were introduced, copies of it should be in the hands of honourable members to-morrow morning.

The Liverpool Corporation Water Bill, which is to authorize the Corporation to carry out what is known as the Vyrnwy scheme, came on for second reading last Tuesday. The unusual course was adopted of attempting to strangle the measure by an endeavour to prevent the second reading. It is almost a wonder that the attempt was not successful; it would have been if Mr. Sclater-Booth had not come to the rescue, and urged the House to consent to the Bill being read, and then referred to a Hybrid Committee. To this course the House consented, and presently we shall have the spectacle of a grand fight between the Corporation of Liverpool and the opponents of the scheme, who have not yet clearly declared themselves. The reasons put forward against the second reading of the Bill by Mr. Rowley Hill, the member for Worcester, were neither strong nor were they strictly accurate. He argued that the Vyrnwy watershed did not geographically belong to Liverpool, whom he recommended to go to their own district for an additional supply of water. The fact is that no further supply can be obtained in the district of Liverpool, and the Corporation must, therefore, look abroad for some other source from which to satisfy their needs. It is perfectly true that it has been recommended by a Royal Commission that no corporation or other water authority should be allowed to invade the natural watershed of another authority, unless strong reason could be shown for departing from the rule. But who besides Liverpool want the water of the Vyrnwy? The water runs to waste during the greater part of the year, sometimes assisting in flooding the banks of the Severn and doing enormous damage. There is every reason to believe that if the scheme of the Corporation of Liverpool be carried out, all the inconveniences which ensue from the present condition of things will be remedied. The Corporation will store flood water when heavy rains prevail, and so prevent inundations. Again, they will, in dry seasons, let out the water so stored, and so prevent droughts. In fact, in the minds of reasonable people, a strong belief exists that the operations of Liverpool will conduce to the improvement of the Severn. At all events, 151 riparian proprietors believe this, and have petitioned in favour of the Bill. The Local Authorities who have threatened opposition will probably be frightened from going on, when they come to consider the enormous expense they will be put to, and the little they will have to gain. The various towns and cities of which the water supply is drawn from the Severn will, after Liverpool has supplied its needs, have an ample quantity to meet all their possible requirements. Beyond the natural supply, which is not drawn upon by the Corporation, this body contracts to give compensation water of not less than eight million gallons per day. This regular addition to the natural run of the Severn will certainly, so far as we are able to judge, be sufficient to keep the river in free flow, and at the same time assist in giving to the cities and towns whatever water they may want for the supply of their districts. As for the possible destruction of the salmon spawning-grounds, on which so much stress is laid, that is a question which is certain to be thoroughly threshed out before the Committee, and nothing need be said about it here, further than to express a hope that all the fears of the "croakers" will be dissipated by the scientific evidence of the naturalists and others who will be called by the Corporation. It will probably be proved to the Committee that no real danger to the spawning-grounds will be threatened if the Bill of the Liverpool Corporation be carried out. But what if they were? As we said last week, the value of a few salmon cannot be placed against the wants of a vast population like that of Liverpool. Salmon may, in time, become a luxury available to only the rich; but the poor of Liverpool want water, and must have it. To say that the Corporation are anxious to obtain water to sell to the manufacturers, and so make profits which may be used in supplementing the rates, is no argument against the scheme. They want water for every purpose for which it is required within their limits—whether it be for manufacturing operations or domestic use. He is certainly no friend to a poor population who would curtail the supply of water for manufacturing purposes.

To increase the charge for water to manufacturers would, no doubt, have a tendency to diminish the quantity consumed; on the other hand, a lower price would tend to encourage a larger consumption. The Corporation of Liverpool have reduced the charge for water to manufacturers, but left the cost of a domestic supply at the same rate; and a question has arisen as to the legality of the step taken by the Water Committee. It has been argued that, by an Act passed in 1847, a reduction of rates and charges shall be made equally to all consumers. There is in Liverpool, as many of our readers will remember, a House and Land Owners Association, and this body have determined on having the water accounts of the Corporation thoroughly overhauled. They therefore applied to the Recorder, at the Borough Sessions, on the 20th ult., to appoint a competent accountant to examine those accounts. It is well that Corporations should be called to book, for their proceedings are not always in consonance either with the law that should govern them, or the principles that should regulate them. An accountant is certain to be appointed, and we are sure to hear a good deal more of this matter.

Liverpool is still troubled with its refuse. The Corporation are now carrying it out to the mouth of the Mersey, and there shooting it into the water. This, as we have already pointed out, is a waste, and it becomes a question for the Health Committee of the Corporation to consider whether or not another mode of dealing with the refuse may not be found, by which a portion, at all events, of the valuable ingredients in the accumulations may not be realized. The proposal now is to follow the example of some other large towns in the North, who, after separating the vegetable and mineral refuse, burn the former for charcoal, and the latter for ash, both of which are utilizable products. Of course, the difficulty at Liverpool is the large quantities daily thrown on the hands of the Corporation; otherwise it might be found that the vegetable charcoal could be used for sanitary purposes, while the ash might be worked up by the brickmakers.

The Colne Valley Water Company held their half-yearly meeting on the 23rd ult. The Company certainly make progress, but very slow, and their balances are still on the wrong side. A question arose at the meeting as to the advisability of the Company endeavouring to obtain some consideration from the Metropolitan Water Trust, if ever that body shall be constituted. Some day or other we believe that London must have the Colne Valley water. Supposing the Trust to be formed, we have no doubt that the Company would be bought up within a short space of time; but at the present moment, perhaps, no dreams need be indulged in. The Water Trust is not constituted, and perhaps never may be.

The Corporation of Colchester have achieved the object of their ambition, and have obtained power from the Local Government Board to borrow £83,000 to complete the purchase of the water-works. Now we shall see what we shall see. Doubtless the water supply of Colchester may be improved, but will the Corporation do it? We shall watch their proceedings with much interest, and if they really do any good, we shall not be slow to chronicle the fact. In the meantime, we may express a doubt whether the inhabitants of the town will be any better off as regards their water supply, or the charges made for it.

The Purchase of the Colchester Water-Works by the Town Council.—A special meeting of the Colchester Town Council was held last Wednesday, when the final arrangements for the completion of the purchase of the water-works were carried out. The sanction of the Local Government Board had been received to a loan of £82,500 for the purpose, the period of re-payment to extend over 50 years. It was stated that the present net revenue was £2900, and that only £300 more per annum would be required to pay the interest on the amount of the loan. A strong opinion was expressed that, although there would at first be a small charge upon the rates, the works would, when extended, pay all the purchase-money themselves.

Belper Gas and Coke Company.—The ordinary general meeting of this Company was held on Monday, the 23rd ult.—Mr. I. Hanson in the chair. The report of the Directors was adopted, and a dividend of 5 per cent. for the half year declared. Mr. W. E. Webster was elected a Director in the room of Mr. Crossley, and Messrs. Hanson and Pym were re-elected Directors. Mr. R. Pym was re-elected Auditor. In responding to a vote of thanks, the Chairman alluded to the extensions that had been made by, and the prosperous state of the Company, and said he thought there was no occasion for the Shareholders to fear that they would be snuffed out by the electric light.

The Gas Supply of Long Eaton.—The negotiations in reference to the transfer of the undertaking of the Long Eaton Gas Company to the Local Board have advanced another step. Last Thursday a conference was held between a Committee of the Board and the Directors of the Company, when an offer was made by the former of £8 10s. for each original £5 share, and £4 19s. a piece for the new shares (£2 10s. paid). This was declined by the Directors of the Company, and the Committee of the Board then retired for a further consultation, at which it was decided to increase the amount to £8 16s. for the old, and £5 5s. for the new shares. A special meeting of the Shareholders of the Company will take place this evening, to consider the propriety of agreeing to this last offer.

URBAN WATER SUPPLY.

We commence in the present article the consideration of the water supply of the towns within the drainage areas of the Ouse and Humber, so far as they are given in the parliamentary Return on this subject. With few exceptions, all these towns are in Yorkshire, and with about the same number of exceptions all the towns in Yorkshire are included in the drainage area now under consideration.

The River Ouse is essentially the water channel, cut in the soft rocks of the new red sandstone, to convey to the great estuary of the Humber the drainage of the eastern slopes of the high moorlands separating Yorkshire from Lancashire, and extending southwards to the High Peak of Derbyshire. The drainage is effected by seven principal streams, all rising on the mountain limestone or millstone grit, and originating in the heavy rainfall of the Penine chain. This rainfall averages 35½ inches in Yorkshire, but is not more than 31½ in Derbyshire. The Swale, the Ure, the Nidd, the Wharfe, the Aire, and the Calder are fed by the country on which the greater rain falls, and the Don by the rest. The rocks traversed by these rivers belong chiefly to the mountain limestone and millstone grit series, overlaid towards the south by coal measures, and then again towards the east are covered by a narrow strip of magnesian limestone, and then a wide expanse of new red sandstone. Farther to the east the rocks of the oolitic series form an eastern moorland. Draining into the Ouse near to its confluence with the Trent, are the surface rocks in the southern part of the main tract, and owing to their vicinity, to the extraction of the coal by hundreds of pits, and to the use of coal in obtaining steam used for driving machinery and for other purposes, a vast manufacturing population has here grown up, collected into more than two hundred towns, of which the total number of inhabitants greatly exceeds a million.

Receiving these waters from the west, the Ouse is also joined by the Derwent, which drains the large but much less thickly peopled oolitic district to the east, already alluded to, and afterwards by the Trent from the south. Of this latter river the history, so far as water supply is concerned, was given in our last article. The combined waters now take the name of the Humber, and, as an estuary or open tidal channel, continue their course to the sea, receiving on their way streams from the north and south passing some towns of importance.

It results from these conditions that, except in the case of the towns situated near the mouths of the tributaries or on the Ouse and Humber banks, there is little opportunity for water supply from wells, and most of the populations of the important towns receive the streams, springs, or collected rainfall stored in reservoirs in the upper valleys, and conveyed down by gravitation. Some of the most magnificent engineering works of modern times are the result of the need for conveying to these urban populations a sufficient supply of pure water for domestic and manufacturing purposes. A complete history of such works and also of the towns supplied would possess very great interest and some value, but was not to be expected in the Return now under notice. We will endeavour to put before our readers, in systematic form, the amount of information actually communicated.

The northernmost of the Yorkshire rivers flow only over the mountain limestone and millstone grit, and have a comparatively small population. Thus, in the drainage area of the Swale, Richmond and Northallerton are the only towns referred to in the Return, though Thirsk, Bedale, and Reeth are other towns each with a population exceeding a thousand. Richmond has a constant supply from springs, the water being collected about two miles from the town. The quantity supplied is 36 gallons per head per day. The cost of works has been rather less than 10s. per head of population, and the charge for water is little more than 2d. per thousand gallons. Northallerton has no works, and is supplied by wells.

In the Ure drainage area there are several small towns, but only three of which the population exceeds a thousand. Ripon has a constant daily supply of 25 gallons per head of filtered water drawn from the river. The cost of works has been nearly 47s. per head, and the charge is about 3¼d. per thousand gallons. At Masham, the next largest town, there are no works. Hawes, nearly as large as Masham, is not mentioned. The Nidd drainage area contains Harrogate and Knaresborough. The former important town is supplied by a Company, and the Sanitary Authorities referred to can give no information. Knaresborough receives daily upwards of 20 gallons per head of the filtered waters of the river that flows past it. The works have cost about 48s. per head of population, and the charge is about 5d. per thousand gallons. There are no other towns of any magnitude in this drainage area.

We come now to the Wharfe, the last of the streams draining the millstone grit uncovered by coal measures. In this catchment area there are few towns, and Otley is the largest. It has a daily supply per head of about 27 gallons of water taken from small streams, collected in a reservoir, and charged for at the rate of 4d. per thousand gallons. The cost of works is equivalent to £2 2s. 5d. per head. Ilkley, a smaller town of less than half the population, is also supplied from springs collected on the moorland in service reservoirs, and carried to the town by gravitation. The quantity available is said to be equal to 100 gallons per day for the present number of inhabitants, but the actual quantity used is not stated. The cost of works has amounted to upwards of £6 per head of the present population, and, assuming the consumption to be limited to 20 gallons per head per day, the charge is as much as 1s. 7d. If, however, as is more probable, 40 or 50 gallons are taken, the charge can only be regarded as half, or less than half that sum. Burley, another town in this drainage area, is also supplied with water from springs, collected in a reservoir. Here the works have cost nearly £5 per head of the population. The supply is said to be constant and sufficient, and, assuming 20 gallons as the average, the charge per thousand gallons amounts to 10d. In this matter of charge, the same remark applies as that just made. There are two other towns in the Lower Wharfe Valley—Wetherby and Tadcaster—not included in the Return.

The Ouse commences at the confluence of the Swale and Ure, but there is no town on the combined waters till after it has been joined by the Nidd, and also by another small stream from the left, on which is the town of Easingwold, not mentioned in the Return. Soon afterwards the Ouse reaches York. This important city has a constant supply of more than 40 gallons per head per day of filtered Ouse water, the charge averaging a little more than 4¼d per thousand gallons, and the cost of works per head of population having been £3 15s. A little below York the Wharfe comes in, and between it and the confluence of the Aire are the towns of Cawood and Selby. Of the former there is no mention. Selby, situated on the new red sandstone, is supplied with about 20 gallons per head per day of well water, the cost of works having been about 20s. per head of population. The charge cannot be ascertained, as, although the water-rate is stated to amount only to £264, the annual cost of carrying on the works, and the instalment for repayment of loan are said to amount to nearly £400. There is probably some error in the figures.

We now come to the consideration of the towns on the drainage area of the rivers which flow over the coal measures. Of these, the Aire and Calder may be regarded as independent streams, though they unite shortly before they reach the common channel of the Ouse. The Aire drains only 340 square miles of country before being joined by the Calder, but within this area there are fifty towns, each having a population exceeding 1000, and nearly all above 3000. The total urban population is about 670,000, to which must be added the population of a number of crowded villages more or less connected with manufacture. It will be evident that such populations must seek for a supply of pure water from a distance. The water from colliery pits is not likely to be satisfactory, and the streams are necessarily loaded with impurities. The great towns within the district have, therefore, taken advantage of the adjacent moorlands, which receive a heavy rainfall and are very thinly peopled, and have established for themselves, in the upper valleys of these streams, which are numerous and favourably constructed for the purpose, numerous large storeage reservoirs, where the flood waters are preserved for the use of the towns in time of drought, and when the rivers have become unfit for domestic use and manufactures by passing so many thickly-peopled towns. Within the Aire drainage area there are two principal towns—Bradford and Leeds—of which the gigantic reservoirs not only form lakes in the upper valley of the Aire itself, but also take advantage of those of the Wharfe, and secure ample supplies of excellent water available for 600,000 out of the total urban population of 700,000 dwelling in the Aire Valley.

Situated in the upper part of the valley of the Aire are some towns with independent supplies. Gargrave and Skipton are the first of these. The former is small, and not mentioned in the Return. Skipton has a small catchment of 380 acres, with storeage reservoirs, from which is obtained at all seasons a constant daily supply of upwards of 30 gallons per head. The cost of works was about £5 per head of the population, and the charge for the water is 5½d. per thousand gallons. Next in order is Keighley, a large town supplied

by the springs and streams on the moorlands, the water being stored and filtered. The supply is said to be abundant, but the amount is not stated, and there are no figures given from which we can determine the cost of works or the charge per thousand gallons. The town and district of Bingley (including a population of 18,000 in all) are supplied with water from the Keighley reservoirs. Oakworth is also supplied from Keighley, at the rate of 5d. per thousand gallons. Shipley, a large town, has an independent supply from reservoirs, the works having cost nearly £6 10s. per head of the population. They were still incomplete at the date of the Return, but the water supply was constant and large. The charge was nearly 4½d. per thousand gallons. Windhill is supplied from Shipley with about 11 gallons per head, at a charge of 7·3d. per thousand gallons. The town of Oxenhope is supplied with water from springs on the hill sides adjoining, but has no works. Haworth has 10 gallons of water distributed per head per day. The cost for works was about 15s. per head, and the charge is 6¾d. per thousand gallons. There are two small towns—Denholmegate and Wilsden—which have independent supplies, but no public works.

All the towns on the Aire, and within its sub-drainage area, below the point we have now reached are supplied by either Bradford or Leeds, with the exception of a small number which we will here refer to, leaving the supply of those great manufacturing centres and the towns dependent upon them for another article.

Baildon receives water from springs, collected into reservoirs. No measurement of quantity is made, and the distributing works are not complete. The cost of works is at the rate of 50s. per head, but the charge is not estimated. Assuming the supply to be at the rate of 20 gallons per head per day, which is sufficient, the rate would be 4¾d. per thousand gallons. Yeadon is supplied by a Company allowing 50 gallons per head per day, but only about one-fourth of the population take advantage of the Company's works. The water is pumped into reservoirs, and the cost of works was very heavy, approaching £12 per head of population. The charge is nearly 10d. per thousand gallons. Horsforth is supplied from a catchment, the water being collected into a reservoir. The quantity is 15 gallons per head per day. The cost of works is mentioned, but the figures given are probably erroneous. The charge is 7·4d. per thousand gallons. Castleford is one of the few towns in this part of the country supplied from wells. The wells are said not to be artesian, but their yield is described as very large. About 12½ gallons per head per day are supplied. The cost of works was nearly 50s. per head, and the charge is about 7d. per thousand gallons. Featherstone is another rather large town at present served from private wells, but works are in progress for a systematic supply.

Communicated Article.

THE CORROSION OF IRON.

By Mr. William Foster, M.A. (Cantab.), F.C.S., &c.,
Professor of Chemistry at the Middlesex Hospital.

Sixth Article.

I have taken linseed oil as an example of the second class of varnishes because of its great importance. It is the only example which concerns us. Linseed oil is a member of a small group of fatty substances having a property in common—that is, of absorbing oxygen and becoming resinous. These fatty bodies consist of an organic acid radical combined with an organic base, the whole presenting a close resemblance in chemical constitution to an ordinary metallic salt. For instance, ferrous sulphate ($FeSO_4$) consists of a base, iron (Fe), combined with an acid radical (SO_4), such radical being characteristic of sulphates. Now, upwards of 90 per cent. of ordinary linseed oil consists of a compound (linolein), the base of which is glyceryl (C_3H_5), and the acid radical associated with it is that of linoleic acid. Free linoleic acid has the formula $HC_{16}H_{27}O_2$. The formula of linolein is $C_3H_5 3 (C_{16}H_{27}O_2) = C_{51}H_{86}O_6$. It is also usual to speak of those compounds containing glyceryl as glycerides. In addition to the glyceride linolein, linseed oil contains small quantities of glycerides of the organic acids, elaïc, myristic, and palmitic. These compounds are known as elaïn, myristin, and palmitin. When linseed oil (in the main linolein) is exposed to the air, oxygen is absorbed, with the formation of new products. Two of these have been studied. The linoleic acid radical is converted into that of oxylinoleic acid ($HC_{16}H_{25}O_5$), and this, in turn, suffers further oxidation, giving rise to a neutral, amorphous, and elastic substance resembling caoutchouc named linoxyn ($C_{32}H_{54}O_{11}$). It is to the formation of these two substances, and particularly the latter, that linseed oil owes its value as a varnish. This tendency on the part of linseed oil to absorb oxygen and pass into new forms is much increased by heating the oil with oxide of lead (litharge). In this process a lead salt of linoleic acid is formed, but the exact nature of the change by virtue of which the "boiled oil" more readily resinifies—that is, passes into a mixture of oxylinoleic acid and linoxyn—is not understood. When linseed oil, either in the natural state or "boiled," is applied as a protective varnish, it is obvious, from the nature of the changes necessary to form a hard skin, that time is an element which has to be considered; and further, that as the outer surface resinifies first, ready access of oxygen to the underlying layers of oil is prevented. The perfect adhesion of the varnish being dependent on the thorough hardening of the underlying layers, everything which retards this result diminishes the usefulness of the oil as a varnish. As a matter of experience, it is known that when linseed oil is applied to the surface of wood and of metal (say iron), the oil more readily hardens in the first case than the second. It would appear from this circumstance that some product or products are formed in the oxidation of the oil, in addition to the two I have considered, and that these are influenced (probably removed) by the absorbent character of the wooden surface. For instance, I have not considered the fate of the radical glyceryl (C_3H_5), when its acid radical is oxidized and converted into the neutral substance linoxyn. All evidence on this point is wanting in the researches to which I have referred. There are also the other three glycerides, constituting more than 10 per cent. of the original linseed oil. The practical aspect of the whole question is, that although linseed oil forms an excellent varnish for wood, it is much less useful for iron. That its desirable qualities are those of forming a hard elastic coating, which mainly consists of a neutral principle, such substance being incapable of forming definite chemical compounds with most of the numerous bodies usually employed as a basis for a mineral paint.

Varnishes of the third class, though extensively employed, are never used alone for coating ironwork. The members exhibit the characters of those belonging to the two classes we have already considered. In the first place, they contain a solid basis dissolved in some spirituous solvent, such basis being left unchanged on evaporation of the liquid; and, in the second place, one or more of the compounds present gives rise to a solid substance by atmospheric oxidation. The only instance of a varnish of this class which I shall consider is afforded by a mixture of linseed oil and commercial turpentine. Such a mixture is the one generally used in conjunction with metallic oxides for the purpose of preparing a paint. The behaviour of linseed oil in this instance is not different from that when exposed alone. The use of the turpentine is chiefly for the purpose of rendering the mixture more fluid, so that it can be more readily applied; and as the turpentine is in some measure volatile, the varnish (or paint) dries rapidly, in consequence of loss through evaporation of a portion of this component. *Commercial* oil of turpentine is a solution of solid resinous substances in a limpid volatile oil. When submitted to distillation, the resinous substance (colophony) remains behind in the retort, whilst the limpid volatile oil passes over. The latter constitutes rectified turpentine, and when pure has the formula $C_{10}H_{16}$. Its property of easily dissolving resinous substances is well known, and particularly fits it for use as a solvent of such compounds in varnish-making. Turpentine is capable of directly uniting with water, forming a crystalline compound. On free exposure to air it partially evaporates, whilst a portion undergoes oxidation, furnishing resinous and other products. The resinous substances chiefly concern us. They are kept in solution in ordinary cases by virtue of the solvent action exercised by the unaltered turpentine. They are known as acid resins, and are identical in chemical character with common rosin, or colophony. In fact, the latter is believed to be formed by the oxidation of the volatile oil $C_{10}H_{16}$ in the woody tissue of those trees which yield commercial turpentine. Thus—

$$2\,C_{10}H_{16} + O_3 = C_{20}H_{30}O_2 + H_2O.$$

Rosin, or colophony, is therefore not only present in commercial turpentine, but is also produced from the latter by oxidation of its volatile oil. It is a brittle glass-like solid, exhibiting different shades of colour according to the temperature employed in its manufacture. Its colour ranges from pale yellow to deep brown. The older writers regard it as a mixture of three isomeric acids—namely, pinic, sylvic, and colopholic acids, each of which has the formula $C_{20}H_{30}O_2$. A recent writer on the subject considers rosin to be chiefly abietic anhydride ($C_{44}H_{60}O_4$), which, when combined with a molecule of water, furnishes abietic acid ($C_{44}H_{62}O_5$). Rosin is readily reduced to a powder, is insoluble in water, and combines directly with caustic alkalies to form soluble salts. One of the chief commercial uses of rosin depends on the latter circumstance. Rosin and caustic soda, heated together, form a soluble salt, which is largely produced in the manufacture of ordinary yellow soap. Though rosin is insoluble in water, the two are capable of combining together, forming a hydrate when they remain in contact for a length of time. This circumstance interferes with the use of turpentine when employed in preparing paints intended for immersion in water.

Having considered the behaviour of linseed oil and of turpentine when exposed to atmospheric oxidation, and some of the characters of the products formed, we are in a position to deal with the subject of mineral paints. These consist of mineral substances usually ground up with linseed oil and turpentine. Lead compounds, ferric oxide, oxide of antimony, sulphide of zinc, silica, and barium sulphate (heavy spar), are common instances of the substances employed in paint-making. Such compounds, when they are ground up with oil, are merely suspended in it without entering into chemical combination during the process of mixing, or afterwards when the paint is used in the ordinary way. When the paint is dry the particles of the mineral substance are rendered adherent to each other and the painted surface by being imbedded in the solid oxidation products of the oil and turpentine. Though lead oxide, when boiled with linseed oil, does form a lead compound with some of the components of the oil, there is little reason for believing that a similar result is obtained by mixing the two substances and exposing them at ordinary tem-

peratures. Lead paints furnish the worst examples of mineral paints for the protection of iron gasholders. The ordinary compounds of lead used in paints are so sensitive to the action of sulphuretted hydrogen, that even small quantities of the gas betray their presence in consequence of producing the black sulphide of lead. When the lead compound is the oxycarbonate (white lead), this change gives the surface an unsightly appearance. Further, the conversion of the carbonate of lead into sulphide brings about a disintegration of the paint to such an extent that it is found, as the result of careful experiments, that a lead paint "perishes" more rapidly than any other when used on iron, and exposed to the joint influence of water and air containing even traces of sulphuretted hydrogen.

Ferric oxide (Fe_2O_3) is a substance which has found much favour as a basis for a mineral paint. In the condition of a hydrate (Fe_2O_3 $3H_2O$) ferric oxide exhibits the property, in a marked degree, of combining with sulphuretted hydrogen. In fact, the object of the gas engineer is especially to obtain ferric oxide presenting the degree of hydration shown by the above formula when he requires it for the purpose of gas purification. When used as a basis for paint, it is necessary to obtain it in an anhydrous condition. In the latter state, and particularly after having been strongly heated, it is very hard, and not readily affected by sulphuretted hydrogen, or even by mineral acids. It is, therefore, well fitted for a paint when its colour is not an objectionable feature. The oxidation products of linseed oil and turpentine do not in the least affect such ferric oxide. They merely act mechanically in binding the particles of the oxide together.

The employment of the other mineral substances I have named calls for little comment. Each is usually preferred for some advantage it possesses over the rest in colour. Where a white colour is needed, either barium sulphate (heavy spar), zinc sulphide, or silica may be used as a basis. I am not aware that barium sulphate is ground in oil and sold as a paint under its *own* name. However, it is very extensively employed as an adulterant in cheap lead paints and powders, some samples of dry red lead in the market containing as much as 60 per cent. of this adulterant.

The value of a paint for the protection of a gasholder is, therefore, almost entirely determined by the character of the medium used in mixing with the mineral substance. With reference to paints generally, Mr. Douglas, in the paper I referred to in a former article, says "their lives will be bounded by that of the vehicles by which they are attached, and this rule is true of all paints, whatever be their colour or description."

The question naturally arises—What are the best methods of applying varnishes and paints for the preservation of iron gasholders? I have already considered the advantages of coal tar, when applied to the iron surface in a hot condition. As a preservative varnish it stands at the head of the list, and should be used first. To counteract the viscous character of the pitch, mineral paints, with the exception of lead paints, may then be used with advantage. A choice of colour, more than anything else, determines the kind to be used. When the paint hardens on the properly-tarred surface, a skin is formed, which gives support to the underlying pitch, and the compound layer thus formed is a fairly efficient preservative of the iron. The paint is, of course, prone to give rise to oxidation and hydration products when subjected to the action of air and water, and, after a certain period, will cease to afford the underlying pitch its needed support; but still the mischief for some time will be purely of a superficial character.

I have said nothing about the electrical influences which are claimed for certain mineral substances when ground up as a paint. The arguments in such cases are extremely unsatisfactory. We have seen that the particles are imbedded in a hard resinous layer which in itself is a non-conductor of electricity. Therefore, whatever may be the deportment of iron and a given metallic oxide in a given solution, one cannot argue from such a circumstance that anything like the same action would obtain when the particles are imbedded in, and insulated by a resinous layer. The case entirely differs from that of preserving iron at the expense of metallic zinc by coupling the two together, the principle of which was originally discovered by Sir Humphry Davy.

(*To be continued.*)

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

METER-RENTS.

Sir,—In your issue of Feb. 17 you request your readers to express, through the medium of the Journal, their views on the subject of meter-rents. The charging of meter-rents by gas companies is, by some consumers, considered to be a great grievance; but from the suggestion that it is a substantial grievance which requires redressing, I decidedly dissent.

Every person must allow that meters represent capital, and therefore should contribute their proportion to a gas company's revenue. Whether they should pay direct interest, in the form of rent, upon the amount invested, or whether that interest should be derived indirectly by charging more for the gas consumed, is the question at issue. We are often told by tradesmen who are consumers of gas, that when they sell a pint of beer or a pound of sugar, they do not charge anything for the use of the pint pot or the scales; and from this they argue that gas companies should not charge for the use of meters. They might with as much show of reason assert that they do not charge us for the privilege of using their premises. Certainly, they do not make a direct charge for these things; but they must be recompensed indirectly, by placing upon the article they sell a price sufficient to cover all charges, and leave a margin for profit. But we cannot justly compare pint pots and scales with gas-meters—the cases are not parallel. In the one instance the articles are obtained for a few pence, or at most a few shillings, often last for generations without any expense for repairs, and are not specially reserved for the use of one customer, but are compelled to serve all and sundry; whereas, in the other case, gas companies are obliged to supply to every customer, for his use and his alone, an expensive and delicate machine costing pounds.

Another grievance is that owing to the heavy rent on small meters as compared with the larger sizes, the small consumer is compelled to pay more in the aggregate for his light, in proportion to the gas consumed, than an individual who is a larger consumer. But it is a recognized commercial principle that large purchasers should have an advantage over those who do not invest to the same extent—there is always a reduction allowed on taking a large quantity. The reasons why this principle should be recognized and acted upon by gas companies are particularly strong. The small consumer occasions the same labour in inspection, reading index, and general supervision, as the largest consumer in the district. But let us suppose the custom of charging meter-rents was abolished. Imagine a person who made a request to be supplied with gas, being furnished with a meter for which he was to pay in proportion to the amount of gas consumed. He may have a large house. He may, therefore, require to be supplied with a meter in proportion to the size of his residence—say one capable of supplying 20 lights—and yet he may not consume more than 500 or 1000 feet per quarter. This would be a direct loss to the gas company, and unfair to the other consumers, who would, of course, have to pay more than their share, owing to the existence of such a system. For this person's gas supply, all the inspection would be required that is necessary for the largest consumer, and there would be the same risk of leakage at his service-pipe; yet to compensate for all this risk and labour, as well as depreciation, he only pays a few shillings per quarter. This may be an exaggerated instance, and one which would rarely occur in practice; but such a thing is possible.

For these reasons I am a supporter of the system of meter-rents, believing it to be fairer to both consumer and company than that of charging indirectly upon the gas consumed.

Feb. 27, 1880. T. O. M.

THE GAS REFEREES SULPHUR TEST.

Sir,—In his account of the accident that occurred to him whilst using the Gas Referees sulphur test, Mr. Greville stated his belief "that the variations in the amount of liquor produced by different apparatuses, and even in some cases by the same apparatus, are in great part explained by the fact" he there points out. In his reply to my letter, I am glad to see a modification in his belief, for he there adds that he does not wish his communication to convey the impression that the source of error alluded to exists to any large extent.

I must beg to differ from Mr. Greville on one little point—namely, as to its being an accident exceedingly likely to pass undetected. For my part, I should say it was exceedingly unlikely to pass undetected—the appearances of liquor running over the trumpet tube being strongly marked. Liquor does not run down the sides of the trumpet without leaving a trace of its passage. Even the few drops that collect in the trumpet round the burner when the test is first put to work evaporate and leave a very obvious residue; but supposing that the liquor should run over whilst the test is at work, and be unnoticed (a highly improbable supposition in a gas-works, where there is always some one about), yet I contend that it would be impossible for me to pick up the trumpet tube and wash it out without noticing what had taken place.

It is a custom with many persons to keep a record of the amounts of liquor obtained from their sulphur tests; and I hope they will not too hastily attribute the inevitable variations to loss of liquor by leakage, but seek a little consolation from Mr. Greville's most recent assurance that he does not want to make us believe that the error exists to a large extent.

I trust Mr. Greville will excuse me for having taken his words literally, and believe that I have written only in honest defence of the sulphur apparatus used by the Gas Referees.

Another F.C.S.

FROZEN LAMP SERVICES.

Sir,—In several recent numbers of the Journal I have found different remedies suggested for frozen lamp services; but what I have sought in vain is some means of *preventing* them freezing at all. And yet, judging from an experiment I made this winter, I suppose such a means exists. For certain reasons unconnected with this subject, I was obliged to fit up some of my lamp-columns with lead instead of iron pipes, and I observed that these lamps were not affected by frost during winter, notwithstanding that they were exposed to the wind in all directions, while the other lamps, in a less unfavourable position, were very often frozen. I may add that the lead pipes used were of the strong kind usually employed for water services—$\frac{1}{2}$-inch diameter and $\frac{1}{8}$-inch thick. The prevention of the freezing of these lamp services I ascribed to the fact of the lead being, compared with iron, a bad conductor of heat.

Another means of preventing lamp services freezing would, in my opinion, be to fill the space between the iron pipe and the lamp-column with some material which is a bad conductor of heat—for example, tar and sawdust.

Rotterdam, Feb. 20, 1880. C. T. Salomons.

We have received from Mr. J. O. N. Rutter, of the Brighton Old Gas-Works, a copy of "D. B. Friend's Almanac, Diary, and Local Guide to Brighton for 1880." What we would call attention to, and commend to others in the gas profession as worth imitating, is a chapter entitled "Advice to Consumers of Gas." In this Mr. Rutter has conveyed a mass of practical information on the management of gas by householders—as to the reading of a meter, attending to burners, fittings, &c., stopping escapes, and regulating pressure, &c. There is nothing particularly new in what is said; but the means of getting the information right home to the users of gas, and that in a form in which it will be readily referred to, at all events for a twelvemonth, is worth consideration by others.

Parliamentary Intelligence.

PRIVATE BILLS RELATING TO GAS, WATER, Etc.

Session 1880.

Progress made to Saturday, Feb. 28.

Title of Bill.		Petition for Bill Presented.	Bill Read the First Time.	Bill Read a Second Time.	Bill Reported.	Bill Read the Third Time.	Bill Received Royal Assent.
Ackworth, Featherstone, Purston, and Sharlston Gas Bill	Lords	..	..	..	..	..	..
" " " "	Commons	Feb. 9	Feb. 10	..	..	..	..
Birkenhead Borough Bill	Lords	..	..	..	..	..	..
" "	Commons	..	..	..	..	..	..
British Gaslight Company, Limited (Staffordshire Potteries), Bill	Lords	Feb. 10	Feb. 10	Feb. 23	..	..	..
	Commons	..	..	..	..	..	..
Burton-upon-Trent Corporation Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Cardiff Water Bill " "	Lords	Feb. 10	Feb. 10	Feb. 20	..	..	..
	Commons	..	..	..	..	..	..
Chester Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 24	..	..	..
Cork Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Cork Improvement Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Dagenham and District Farmers (Optional) Sewage Utilization Bill	Lords	..	..	..	..	..	..
	Commons	Feb. 9	Feb. 10	Feb. 17	..	..	..
Dartford Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Dearne Valley Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
" "	Commons	..	..	..	..	..	..
Denton and Haughton Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Doncaster Corporation Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
" "	Commons	..	..	..	..	..	..
Eastbourne Gas Bill "	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 25	..	..	..
Edinburgh and District Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	Feb. 26	..	..
" " "	Commons	..	..	..	..	..	..
Exmouth and District Water Bill	Lords	..	..	..	..	..	..
" " "	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
Gaslight and Coke, Commercial Gas, and South Metropolitan Gaslight and Coke Companies Bill	Lords	..	..	..	..	..	..
	Commons	Feb. 9	Feb. 10	Feb. 17	..	..	..
Great Yarmouth Water Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Hinkley Local Board Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Huddersfield Tramways and Improvement Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Hull Lighting Bill "	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Hyde Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
King's Lynn Corporation Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Lancashire County Justices Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
" "	Commons	..	..	..	..	..	..
Lancaster Corporation Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Lincoln Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Liverpool Corporation Water Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 24	..	..	..
Liverpool United Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 24	..	..	..
London Gaslight Company Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Maidstone Gas Bill "	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
Malton Gas Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Oldham Improvement Bill	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Phœnix Gaslight and Coke Company Bill	Lords	..	..	..	..	..	..
" "	Commons	..	..	..	..	..	..
Portmadoc Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
"	Commons	..	..	..	..	..	..
Prescot Gas Bill "	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
Preston Improvement Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Rathmines and Rathgar Township (Vartry Water Supply) Bill	Lords	Feb. 16	Feb. 16	..	..	..	..
	Commons	..	..	..	..	..	..
Rathmines and Rathgar Township Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
" "	Commons	..	..	..	..	..	..
Reading Gas Bill "	Lords	..	..	..	..	..	..
"	Commons	Feb. 9	Feb. 10	..	..	..	..
Rochester Corporation Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	..	..	..
Sea Water Supply to London Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
"	Commons	..	..	..	..	..	..
Sligo Borough Water Bill "	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
"	Commons	..	..	..	..	..	..
South Metropolitan Gas Company Bill	Lords	..	..	..	..	..	..
" " "	Commons	Feb. 9	Feb. 10	..	..	..	..
Southwark and Vauxhall Water Bill	Lords	..	..	..	..	..	..
" " "	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
Stafford Borough Bill "	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 23	..	..	..
Wakefield Corporation Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	..	..	..
" "	Commons	..	..	..	..	..	..
Wandsworth and Putney Gas Bill	Lords	..	..	..	..	..	..
" " "	Commons	Feb. 9	Feb. 10	..	..	..	..
Wigan Improvement Bill "	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 17	..	..	..
Wrexham Water Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	..	..	..	..
Yeadon and Guiseley Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	..	..	..	..

HOUSE OF LORDS.

MONDAY, FEB. 23.

Petitions against the following Bills were presented:—

Cardiff Water Bill, from Corporation of Cardiff.

Lancashire County Justices (Water, &c.) Bill, from Corporation of Manchester.

Portmadoc Water Bill, from William Edward Oakeley.

Rathmines and Rathgar Township Water Bill, from (1) Owners, &c., of mills and manufactories; (2) Grand Canal Company; (3) Corporation of Dublin; (4) Millowners, &c. (J. B. Johnston and others); (5) Ratepayers and owners, &c., of property in the township of Rathmines and Rathgar and others, in public meeting assembled.

Sea Water Supply to London Bill, from (1) Metropolitan Board of Works; (2) Corporation of Kingston-upon-Thames; (3) Wandsworth and Putney Gaslight and Coke Company; (4) London and North-Western Railway Company; (5) London and South-Western Railway Company; (6) Grand Junction Water-Works Company; (7) Chelsea Water-Works Company.

Sligo Borough Water Bill, from Midland Great Western Railway of Ireland Company.

Wakefield Corporation Water Bill, from (1) London and North-Western Railway Company; (2) Liversedge Local Board; (3) Justices of the Peace of the West Riding of the county of York; (4) Sir George Armytage, Bart.; (5) James Akroyd and Son, Limited, and others; (6) Great Northern Railway Company.

THURSDAY, FEB. 26.

The Lancashire County Justices (Water, &c.) Bill and the Sea Water Supply to London Bill were referred to a Select Committee consisting of the Duke of Bedford (Chairman), Earl Bathurst, Lord Saltersford, Lord Gifford, and Lord Skene; to meet on Monday, March 1.

HOUSE OF COMMONS.

MONDAY, FEB. 23.

A petition in favour of the Hull Lighting Bill was presented from the Committee of the Hull Guardians Society.

THE GOVERNMENT AND THE METROPOLITAN WATER SUPPLY.

Mr. FAWCETT asked the Home Secretary when the Bill relating to the Water Supply of London would be introduced.

Mr. CROSS: I was in hopes that I could have given a definite answer to-day, but the arrangements are not quite complete, and what they may be is still uncertain. I propose to ask the Chancellor of the Exchequer to give me a day to bring in the Bill.

Mr. FAWCETT: May I ask the Home Secretary whether, considering the great pecuniary interests involved in this subject, and the risk of speculation in shares, he will arrange, in order to prevent some people obtaining information before others, that the Bill shall be ready for circulation immediately after being introduced?

Mr. CROSS: I have already taken steps that when the Chancellor of the Exchequer gives a day to bring in the Bill, the print of the Bill shall be in the hands of members the next morning, or as early as possible.

NATIONAL WATER SUPPLY.

Mr. MONK, in the absence of Mr. Rowley Hill, who had given notice of the question, asked the President of the Local Government Board whether, in view of applications from various districts to take water for their own purposes from watersheds with which they have no natural connection, the Government are prepared, in anticipation of legislation upon the subject, to initiate an inquiry into the whole question of water supply.

Mr. SCLATER-BOOTH said this question had been several times under the attention of the Government. At the present time he thought there was not any occasion to institute a special inquiry upon the subject, seeing that ample information was at their disposal should the Government think fit to deal with it.

TUESDAY, FEB. 24.

Petitions in favour of the Liverpool Corporation Water Bill were presented from Owners, &c., on the banks of the River Severn—(1) Frances Cotton Baker and others; (2) F. Strickland and others; (3) H. Fowler and others.

A petition against the Wigan Improvement Bill was presented from Henry Park.

LIVERPOOL CORPORATION WATER BILL.

On the order for the second reading of this Bill,

Mr. HILL moved that it be read a second time this day six months. He said he did so not altogether on account of the individuals connected with the Severn Valley whose interests would be seriously affected if the Bill became law, for this would be more the subject of inquiry by a Select Committee than consideration by the House on the second reading. He simply wished to call attention to the principle of the Bill, which would empower the Corporation of Liverpool to supply themselves with water from a district beyond their own watershed, out of their own geographical limits, and take a supply which hitherto, from time immemorial, had been the source of supply to the districts in the Severn Valley, through which the River Vyrnwy flows. The taking away of the head waters of the river would be a great injury to the population of the valley, inasmuch as these were the only uncontaminated waters flowing into the Severn, the other waters being contaminated more or less according to the nature of the districts through which they ran. On principle, he contended, it ought not to be allowed for one district, however important, to come into another watershed and take away the water possessed by that district, without very much stronger reasons than could be alleged on behalf of the Liverpool Corporation. It should, he said, be remembered that it was not simply taking away a certain quantity of water from the river, but the whole of the waters of the Vyrnwy, except, indeed, a small quantity of 8 million gallons to be guaranteed for the Severn Valley district. But it was not proposed to enforce this guarantee in the event of the scheme sanctioned by the Bill being carried out. There was no provision made for the supply of the district. The Bill simply said "it shall be provided." The Corporation would take the whole of the rest of the water flowing from the Vyrnwy for the benefit of the town of Liverpool, not merely for sanitary but for commercial purposes. The quantity of water they would require for sanitary purposes would be very small indeed, but there were, of course, in Liverpool some large manufacturers requiring a considerable supply of water; for instance, there was a large sugar factory which paid the Corporation about £4000 per annum. So it would be really taking the water of the Vyrnwy from the sanitary uses to which it was at present entirely devoted in the Severn Valley district, in order to enrich the Corporation of Liverpool by the addition of a large revenue, which would follow the supply of the water for manufacturing purposes. The average flow of the Vyrnwy, taking it at the lowest price of 6d. per 1000 gallons, would yield an immense revenue—it would be a mine of wealth. Then, again, the smaller towns on the Severn would be subjected to a heavy expense in defending their natural rights against this invasion by the Liverpool Corporation. It would be almost ruinous to the small towns in the Severn Valley, while, of course, the wealthy Corporation of Liverpool had large resources which they would not hesitate to use to acquire a source of wealth which must considerably relieve their ratepayers. The Royal Commission on Water Supply, which sat some ten years ago, under the presidency of the Duke of Richmond, considered this very question, and reported against power being granted by Parliament for one authority to take a water supply from another district with which they had nothing in common. For these reasons he asked the House to reject the Bill.

Mr. MONK, in seconding the motion, said this was no ordinary case, but one of the greatest importance, and one which very nearly touched the supply of water not only to Liverpool, but to all the large towns and cities in the country. Last year the Thirlmere scheme of the Manchester Corporation was passed, and by the Act sanctioning it power was reserved to the Corporation of Liverpool and other large towns to avail themselves of the scheme for a supply of water. Not only by availing themselves of the Thirlmere scheme would the Corporation of Liverpool be saved a very considerable expense, but they would have the most ready supply, and a supply of which they could avail themselves much sooner than if they went to the Severn watershed. The water-pipes in connection with the Thirlmere scheme were to be laid within three miles of the Liverpool district, and the expense of taking a sufficient supply from Thirlmere would be very much less than by the scheme now before the House. This was a matter of great moment, and the President of the Local Government Board, in replying the previous day to a question he (Mr. Monk) addressed to him, said that the Government were possessed of sufficient information with regard to the water throughout the country to render it unnecessary for any further evidence to be obtained on the subject. It was a matter not only for the Government but for the House seriously to consider whether they would allow this Bill to be read a second time, at all events unless the Corporation of Liverpool could make out a very strong case. At the present moment they had not made out any case whatever; not one word had been spoken in support of the Bill. There could be no doubt it was not only a Bill for the supply of water to Liverpool, but it was a commercial undertaking on the part of the Corporation of Liverpool, who meant to repay themselves for the scheme by selling to towns in Lancashire the water from the Severn district. He had much pleasure, therefore, in seconding the motion of the honourable member for Worcester.

Mr. HIBBERT thought that if the motion just made should be carried, it would be dealing in a very hard manner with the proposal before the House. The honourable gentleman who had last spoken told the House that Liverpool might go to Thirlmere for a supply of water; but he remembered that the report of the Committee on the Thirlmere scheme did not hold out any probability of any towns sharing the supply, beyond those in the immediate neighbourhood of Manchester. Then it was allowed that the Thirlmere scheme could not be completed within a period of ten years. In the face of these facts, Liverpool was compelled to look elsewhere for a water supply. The present supply would only be sufficient in a short time, considering the increase in the population, for nine-tenths of the inhabitants; and then what was Liverpool to do? If the Corporation went to any district, there would be the same objections raised as there were against the Severn source. They could not take water from the new red sandstone wells, because it was found impregnated with sewage, and unfit for consumption. He could not think the House would do well to throw out the Bill on the second reading, without giving the promoters a chance of being heard before a Committee of the House. Whether that Committee should be a Hybrid Committee or the usual Select Committee, was a question for the House to consider. He was of opinion that the ordinary Committee would be sufficient, and he should vote in favour of the Bill.

Mr. REGINALD YORKE said he wished to answer some of the remarks made by the honourable gentleman who moved the rejection of the Bill, inasmuch as he implied there was a great deal of widespread dread in the Severn district as to the effects of the measure. He had received and lodged three petitions from his own constituents, and he found that no less than 105 of the largest owners and occupiers in the district of Tewkesbury and Gloucester, representing the riparian tenantry of the district, were very anxious that the Bill should pass into law. They believed that their property would be much benefited by the construction of the works proposed by the Bill, inasmuch as they would tend to regulate the supply of water, diminishing the floods by which so much damage was now done, and increasing the supply of water in the summer time. This showed that, so far from being afraid of the effects of the Bill, some riparian owners and occupiers welcomed the proposal. In dealing with the motion, he trusted the House would bear in mind that in the neighbourhood of Gloucester there was nothing like a unanimous feeling against the Bill.

Sir BALDWYN LEIGHTON, whose notice of motion in reference to the Bill appeared in last issue, said he desired to appeal to the impartial judgment of the House, and especially to those honourable gentlemen who had given attention to such subjects as the present. This was a proposal on the part of Liverpool to come 70 miles into another watershed for a supply of water, and to make an artificial lake of 1000 acres in extent, submerging a village and a church. But it was not the magnitude of the engineering undertaking so much as the importance of the principle involved that he desired to call attention to. There were in England (excluding the Highlands and Dartmoor) only two great gathering-grounds for water supply on a large scale—the one was the Cumberland Lakes, and the other North Wales. Last year the former was taken by Manchester, and this session it was proposed to take the other for Liverpool. He was ready to admit the urgent necessity of water supply to the great towns of England; but vested interests must be regarded. They could not sacrifice the water supply, navigation, fisheries, and the sanitary requirements of a whole district even to supply another great population. The proper principle, he apprehended, was that no town should appropriate the water supply belonging to another district, unless special circumstances could be shown to justify it. The people of the district must be first served. But Liverpool had said, "We have no alternative." Was that so? He was informed that the Rivington mains only required proper cleaning to supply an additional 4 million gallons a day, and he held in his hand reports to the Liverpool Corporation as to the supply of water from the Cumberland Lakes and from other places. It was not true, therefore, that Liverpool had no alternative. As regarded precedents and principles laid down by the House, they had the report of the Duke of Richmond's Commission and the Rivers Pollution Commission, and there was also the Rivers Conservancy Bill of last year. He found, too, that in 1863 the Bill introduced by Gloucester and Cheltenham, to obtain a supply of water from the Thames Valley, was thrown out on the second reading by a majority of 30, on the ground that the watershed proposed to be taken belonged to the valley. Then they had the Thirlmere Bill, a year or two ago, which was referred to a Hybrid Committee. He would observe that the cases were not quite similar, because in the case of Thirlmere there were no populations affected by the withdrawal of the water, and it was practically a case within the watershed of the town of Manchester. The present Bill ought only, therefore, to be read a second time on the understanding that it be referred to a Hybrid Committee,

with instructions such as those of which he had given notice. As he saw that the President of the Local Government Board had put on the paper a motion substantially the same as his own, and that, in fact, he had adopted his (Sir B. Leighton's) proposal, he ventured to ask his honourable friend the member for Worcester to withdraw his motion.

Mr. SCLATER-BOOTH said the Bill was one of a very peculiar character, and there was no wonder that its provisions had attracted the notice of the persons dwelling in the Valley of the Severn. It was not for him to become the advocate of the Bill, but he might venture to say, from the position he held, that he was aware that Liverpool was in great need of an important and extensive water supply. They had no doubt very good reasons to show for the selection they had made in the plans now submitted to the House. Whether the selection would prove to be a good one, and whether it was one which the House would ultimately sanction, was another matter; but, at any rate, the Corporation who had the interest of such an enormous number of people at heart had a right to expect that the scheme would receive careful attention by the House. He regarded the Thirlmere scheme and the present one as analogous, and in his opinion the present proposal should be referred to a tribunal capable of taking a wider view of the matter than an ordinary Select Committee. It seemed to him that the interests of the people of the Valley of the Severn, in trade, navigation, water supply, fisheries, and so forth, ought to be secured and maintained; for they had a *primâ facie* right to—he would not say a monopoly of the water supply. He had taken it upon himself to place on the paper a notice of motion that the Bill be read a second time and referred to a Hybrid Committee with certain instructions, which he trusted would satisfy the honourable member for Worcester and his friends who had opposed the second reading. He moved that this course be followed.

Sir E. LECHMERE said he opposed the scheme, not simply because it was for supplying Liverpool with water, which was absolutely required for the Severn Valley; but because he believed that a large quantity of the water would be used, not merely for sanitary, but for trade purposes, and because the effect would be to obstruct the navigation of the Severn by lowering the depth of its water-way. The river was now navigated for 42 miles, and had a daily traffic of 1000 tons, bringing a yearly revenue of £8000. It was a great artery of commerce in the Midland shires, and as a Commissioner of the Severn he knew that the effect of allowing Liverpool to take such an enormous quantity of water would be to diminish the water necessary for this traffic. He had not heard how the compensation clause was to be carried out, or how far it was adequate to meet the requirements of towns such as Bridgnorth, Worcester, Tewkesbury, and other towns which derived their supply from the Severn.

Dr. PLAYFAIR thought the House would do well to adopt the course proposed by Mr. Sclater-Booth. If a Hybrid Committee were now appointed, having on either side as little local interest as possible, the subject would be fairly examined on its merits. Undoubtedly, a town like Liverpool had great need of water, and a proposal from the Corporation must receive attention, and there was every probability that a Hybrid Committee would do justice to the case. On general grounds, he believed that to refer the Bill to such a Committee was the proper course to adopt.

Mr. RAIKES, referring to what occurred with the Thirlmere scheme, said he hoped the Committee would be careful so to shape the amendments as not to risk the fate which befell the Manchester Corporation Bill in the House of Lords in 1878. He would say nothing on the merits of the Bill before the House, but supported the proposal to submit it to an examination by a Hybrid Committee. It was desirable that the Committee should be assisted by evidence from the Local Government Board, which would relieve the parties from some expense in calling many witnesses, and such evidence was always more valuable than professional evidence on either side, which was open to the suspicion that they supplied their information to order.

The motion for the rejection of the Bill was then withdrawn, and the Bill read a second time and referred to a Select Committee of nine members, five to be nominated by the House and four by the Committee of Selection. It was also ordered: "That it be an instruction to the Committee, that they have power to inquire into and report upon the present and prospective sufficiency of the water supply of the district which the Corporation of Liverpool are authorized to supply, and into the existence of any other available source of supply; and whether, having regard to the various interests affected by the scheme, and to the present and prospective requirements of the population in the Severn Valley—as to water supply, fishing, navigation, and the scouring effect of floods—compulsory powers should be given to take water from the River Vyrnwy and its tributaries; and, if so, to what extent, and under what conditions as to compensation water, or otherwise; and also what provisions are requisite for enforcing and securing such conditions."

THURSDAY, FEB. 26.

Petitions in favour of the following Bills were presented:—

Great Yarmouth Water Bill, from (1) Corporation of Great Yarmouth; (2) Owners, &c., of Southtown and other places; (3) Board of Guardians of East and West Flegg.

Liverpool Corporation Water Bill, from Householders and freeholders in the parish of Llanwddyn and other parishes in which the proposed works are to be situated.

BARNSLEY GAS COMPANY.—The annual meeting of this Company was held on Monday, the 16th ult., when the Directors report stated that they felt justified in recommending the payment of the full dividends authorized by the Company's Acts; although there would remain a balance of only £573 7s. 10d. to carry to the reserve-fund. This was less by £461 6s. 3d. than the balance carried to the reserve-fund at the end of the year 1878; but was more than accounted for in four ways—first, that the revenue from gas, for the first time during a long period, had not increased in the accustomed ratio, but, on the contrary, had yielded somewhat less for the year 1879 than for the year 1878; secondly, the fall in the price of coke; thirdly, by the increase in the amount (over £400) expended under the head of "repairs and renewals," the Directors having determined to keep up the works to the most efficient state; and, fourthly, the increase in the amount payable for dividends. The Directors hoped to have been able to advise a further reduction in the price of gas to the consumers; but, having regard to the diminution in the Company's income, and to the fact that the amount standing to the credit of the reserve-fund was still very largely below that fixed by statute, and having regard also to the serious loss the Company sustained annually by leakages caused by the winning of the coal underlying Barnsley and the neighbourhood, they felt the question must be postponed for the present. From the accounts it appears the capital of the Company is £90,000, of which £4000 only is loan capital. The expenditure comes to within £887 of the sum raised, £1572 having been laid out last year. The total receipts for the twelve months were £19,983, the net profit on which was £7569. The report and accounts were received and adopted by the meeting, much satisfaction being expressed at the state of the Company's business.

Legal Intelligence.

HIGH COURT OF JUSTICE—EXCHEQUER DIVISION.

MONDAY, FEB. 23.

(*Sittings in Banco, before the* LORD CHIEF BARON *and Baron* POLLOCK.)

TATTON *v.* THE STAFFORDSHIRE POTTERIES WATER-WORKS COMPANY.

This case, which had stood over in order that the parties might agree to the terms of a suggestion thrown out by the Court at the last hearing, on Dec. 11, 1879 [see JOURNAL, Vol. XXXIV., p. 936], that the damages should be reduced from £1400 to £400, came on again to-day.

Mr. BOSANQUET, who appeared for the plaintiff, said that the parties had agreed to accept the £400 (the action being for injuries done to the plaintiff's dyeing-works at Leek by the defendants reservoir at Tiddesworth), but there was some difficulty as to drawing up the order as to costs. He wished to know the direction of the Court as to them.

Mr. JELF, for the defendants, said they had practically succeeded on the argument of the rule, and had even added the £25 paid into court; he therefore thought it would meet the justice of the case if the parties paid their own costs.

The LORD CHIEF BARON said it ought not to be forgotten that the plaintiff had been practically ruined by the rendering of the water muddy by the defendants works, and by the subsequent litigation, and he thought the defendants ought to make up the damages to £450.

Mr. JELF, however, said his clients did not feel justified, having regard to the interests of their Shareholders, in offering any more.

His LORDSHIP then said an application must be made to Justice Stephen, who with himself had heard the rule argued, to give what direction he thought proper as to costs.

SWINDON POLICE COURT.—THURSDAY, FEB. 26.

(*Before Messrs.* H. CALLEY, *Chairman*, E. HANBURY, *and* W. W. CODRINGTON.)

CHARGE OF FORGERY, EMBEZZLEMENT, AND FRAUD BY A GAS-WORKS MANAGER.

William Barrett Swain, alias *William Barrett*, late Manager of the Swindon Gas and Coke Company, was brought up in custody charged with forging, on Dec. 23 last, eight share certificates in the Company, of the value of £10 each, and also with obtaining from a Mrs. Ann Boniface the sum of £80, by false pretences, on such certificates. There was a further charge of obtaining a sum of £50 from Messrs. R. W. Wallace and Co., and a cheque for £25 from Messrs. J. and J. Blott and Co.; and also other charges of embezzling certain sums of money from various customers of the Gas Company.

Mr. BOODLE appeared to prosecute, and, having opened the case,

Mr. *J. E. G. Bradford*, the Chairman of the Gas Company, was called, and said: The prisoner was engaged as Manager of the works on the 26th of April last year, entering into residence on the works on the 1st of May—succeeding Mr. H. Hunt, the present Manager of the Stroud Gas-Works. Prisoner produced most excellent testimonials, one of them being for fifteen years good service. There was a written agreement entered into and signed by the prisoner, who represented himself as the late Manager of the Bedford Gas-Works. The salary was to be £100 per annum, with house-rent, coal, gas, rates and taxes, &c., free. The agreement put in was the one signed. It gave prisoner power to sell coke, but not tar, and provided that all moneys received should be at once paid into the bank. Witness found the prisoner addicted to drink, and his conduct generally very unbecoming. At the December meeting of the Board he was so disorderly that the Directors asked him when it would be convenient for him to leave their service. He mentioned the 30th of January, and this time was accepted, prisoner leaving on the 2nd of February. At one of the meetings prisoner remarked that he could get a much better price for the tar than they were receiving. In the autumn he was asked what was being done with the tar, and made some evasive answer, saying it would be accounted for. The prisoner was irregular with his payments, and when asked by any member of the Board how it was no coke money was paid in, he made some evasive answer. Prisoner was never instructed to deal with the tar, and he (witness) had never heard of Messrs. J. and J. Blott and Co. The tar had been always sent to Messrs. Butler and Co., at Bristol, and they forwarded a cheque direct to the Company for it, the transaction being entered on the minutes. There was no mention of any tar sales from when the prisoner became Manager until he left. Witness knew some tar was sold by prisoner last summer, but he did not know to whom, nor had it been accounted for. In January, 1879, it was reported that 20 shares had been transferred from the executors of the late J. H. Sheppard to Mr. W. H. Tucker, of Chester. He produced eight of these certificates. The eight shares handed in were all forgeries; the signatures—Thomas Strange, John Chandler, John Godwin, and himself—were all forgeries. Some of the shares bore numbers which showed them to have been taken from the share book used by the Company when it was first formed, although they professed to be countersigned by Henry Hunt, who was recently Manager of the Company. The forged scrip showed the date of the Company's proprietary deed to be 1877 instead of 1841. The previous afternoon witness received a letter from the prisoner at the police station, offering to make a clean breast of the whole affair if he would see him. He went to him, and prisoner then said he should plead guilty to everything, except as to some money he was charged with taking from a Mr. Holt. When asked how he obtained the share certificates, he said he took the original plate from the chest, and sent it to London for use in printing them.

In reply to the prisoner, witness said: I remember you bringing me a telegram about the tar last year, but I forget now what it was about, as I told you I could not do business out of the board-room.

Mrs. *Ann Boniface*, a widow, said she knew prisoner as the manager of the gas-works. On Nov. 23 last year he called on her and said he had bought some gas shares, but had not sufficient money to pay for them; would she take two of them? She told him she could not, but she knew some one who would. She asked Miss Eagles, her assistant, if she would have them, and she consenting, she told prisoner. He asked for £12 on account, promising to settle on the following Monday, and she let him have the money. On Monday prisoner brought the books, to settle. She told him that she thought the matter had to be settled at the office, to which prisoner replied that it did not matter, for he had brought the books to save trouble. Miss Eagles then signed the book, and she gave him the other £8. From something she heard from Mr. Ashton, a former Manager of the works, she saw the prisoner again, and told him she had not a transfer paper. He said it was all right, he would let her have one. Prisoner asked her if she could not get a transfer paper from Mr. Froom, a relative, as he had lost his, and she did so, and prisoner drew up one for her like it. The next day prisoner called again and asked if she would take some more shares, as he found he could not do with all he had. She said she did not mind taking three, and gave him £10 on account. The day after he brought her four shares, asking if she would object to taking that number. She told him she would do so, and paid him the £70 balance. On that day she drew his attention to the stamp on the transfer paper, and he told her she had better send it to London to get it properly stamped, and she did so. A few days after this prisoner again called and

said he was thoroughly hard up, and was sorry to say he should have to part with the other two shares he had. She bought these of him, and he brought her the book produced [the original proprietary deed of the Company] to sign. The books of the Company were lying at her house some weeks, and she saw a number of signatures in them of persons who held shares.

Mr. *W. B. Wearing*, Manager of the County of Gloucester Bank at Swindon, said the bank acted as treasurers for the Gas Company. He put in the pass-book, showing the sums paid in, and whether by the prisoner or by the collector Sheppard. The signatures "Thomas Strange" on the forged shares produced he could swear were not Mr. Strange's, nor anything like it.

Mr. *J. Chandler*, one of the Directors of the Company, and one of the Committee of Management last year, denied that the signatures "John Chandler" were his.

Mr. *J. Godwin*, another Director of the Company, gave similar evidence with respect to his signatures on the forged certificates. He had never authorized any one to make use of his signature.

Mr. *Henry Hunt*, the present Manager of the Cainscross Gas-Works, Strood, prisoner's predecessor in the management of the Swindon Gas-Works, said there were two register-books of Shareholders in the office when he left. No. 1 contained the register of shares from No. 1 to No. 400, the other of later issues. The scrip produced bore the name of "Henry Hunt." He had never made the signature, nor authorized any one else to make it. The shares would be entered in the No. 1 register-book. He sold the tar, whilst acting as Manager of the Company, to Messrs. Butler and Co., and they always settled by cheque, which he paid directly into the bank. He never had authority to sell to any one else, except small quantities called for at the works.

In support of the charge of attempting to obtain £25 from Messrs. J. and J. Blott and Co., of the Eagle Chemical Works, Poplar,

Mr. *J. Blott*, of Chadwell Heath, Essex, was called, and said that on the 4th of February he received a telegram from the prisoner, asking where he could see him. He replied, and met the prisoner at his brokers in Mincing Lane. Prisoner there told him the Swindon Gas Company were anxious to sell 10,000 gallons of tar, and he had been instructed to sell it to a good firm, as the Directors had had some trouble with the firm they had previously been doing business with. He agreed to purchase the tar at 1d. per gallon, put into his firm's boats at Swindon. On the 6th of February he received a letter from Swindon, on the printed paper of the Company, and bearing the Company's stamp, asking where prisoner could see him on the next day to sign the agreement, and adding that as the last cheque the Company had received was dishonoured, the Directors would insist upon the deposit of £25 in cash, this part being heavily underlined.

Mr. BOODLE: I think you have another letter, in which prisoner describes the Directors as being "as mad as March hares"?

Witness: Yes.

Mr. BOODLE: Kindly hand it in. It will be no doubt edifying for Mr. Bradford.

Examination continued: On the 8th of February witness wrote to the prisoner, telling him he had sent a cheque for £25, which could be paid into the bank and honoured long before his firm had the tar. To this prisoner replied that he had just left the Directors meeting, and they were all mad; he must have cash, as they would trust no one. The cheque produced by Sergeant Strong was the one he signed and sent to the prisoner. It was crossed, and marked "Not negotiable."

Mr. BOODLE: That business precaution saved you £25, I believe?

Witness: No; saved the Gas Company.

Mr. BOODLE: No; the prisoner at that time was not their servant, he having left on Feb. 1.

In the case of embezzlement from Messrs. R. W. Wallace and Co., of Mark Lane, London,

Mr. *C. Lamb*, the firm's Manager, said on the 15th of May last year he heard from prisoner, and saw him at their offices in London. Witness agreed to purchase all the tar the Company made during a twelvemonth. Prisoner asked for a deposit of £20, and a crossed cheque for the amount was given to him. Prisoner said he did not know if his Directors would accept a crossed cheque, but took it away. The next morning the firm received a letter from prisoner from Swindon, stating that the Chairman was not satisfied with the cheque, and he had returned it, adding that the next day he would run up and explain. He accordingly came, but witness could not meet him, leaving a note stating that the cash should be paid before the firm had the tar. On the back of this note the prisoner wrote that as his terms had not been complied with he cancelled the whole transaction. On the 17th of May witness sent prisoner a Bank of England note for £20 in a registered letter. The first tar they had was at the end of July last, when they received 216 casks. On the 22nd of August a crossed cheque for £22 1s. 6d. to pay the balance due for this lot was given to prisoner in London. He returned the cheque, saying a crossed cheque would not do, the Directors being mad; and then an open cheque was given to him. The firm sent 300 barrels to the gas-works to be filled. In September they received 48 of them full, and an invoice for £13 13s. Prisoner called at the office for this money, and waited there whilst they sent to the bank for the cash. On Jan. 20 this year 50 more barrels were sent, and an invoice for £9, for which prisoner was paid by cheque. He next saw prisoner on the 9th of February, after many letters had been sent him complaining of the non-delivery of the tar at the firm's office in London. Whilst in the office a telegram was handed in to prisoner, from his wife, telling him that Drewitt, the foreman, had just sent off 100 casks of tar for Messrs. Wallace, which telegram the prisoner handed to witness, saying, "There you are; you see the tar is all right." Witness then showed prisoner a statement which he had just received from the Company, showing that his firm owed £39 0s. 6d. for the very tar for which he had paid prisoner cash. Prisoner said this was a mistake, and at once wrote across the statement that it was "all a mistake." Prisoner then stated that he was about to leave the Company's employ, and, wishing to clear up everything before he left, would witness let him have a cheque for the 100 barrels then on the way up. Witness gave him a cheque as requested, and also for 50 casks which prisoner said he had been obliged to purchase in the town to put the tar in. The tar had never arrived.

Mr. *Bradford*, recalled, said he visited the works on Jan. 30 last. He inquired for the prisoner, and found he had gone to London. There was not then at the works any tar waiting to be sent away.

By the CHAIRMAN: The £64 18s. paid by Messrs. Wallace to the prisoner had never been credited to the Company, nor was there any trace of it in their books.

The CHAIRMAN: That being so, and as the money received for tar came in regularly before prisoner was employed, how was it the Directors did not make inquiries?

Witness said they did several times, and prisoner put them off by promises that he would make it all right in due time. He added that he had complained to prisoner of his frequent absence in London, and asked the cause, to which prisoner replied that it was a private matter.

Mr. *S. Hunt*, an accountant, said he had been through the books of the Company with the prisoner, whom he used to assist with the accounts. When the item £39 0s. 6d. for tar to Messrs. Wallace and Co. was reached, he believed prisoner led him to understand it had not been paid. If he had not done so the entry would appear on the cash side.

Police-sergeant *Strong* proved apprehending prisoner at Great Grimsby. He found in his box a pass-book, showing the Gas Company's account up to the 16th of February last. He also found in a purse in his house the cheque for £25 given by Messrs. Blott and Co. to prisoner. He confirmed Mr. Bradford as to what took place in the police-station on the previous day.

Prisoner, who had nothing to say, was then remanded for a week to complete the depositions, previous to being committed for trial.

Miscellaneous News.

ON THE QUANTITY AND QUALITY OF THE WATER SUPPLIED TO LONDON DURING 1879,

BEING THE ANNUAL REPORT SUBMITTED TO THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

By CHARLES MEYMOTT TIDY, M.B., M.R.C.S., F.C.S., &c.

To the President, Council, and Members of the Society of Medical Officers of Health,

Gentlemen,—An average of 32·7 gallons of water per head has been daily supplied during 1879, to upwards of 4 millions of people, by the eight London Water Companies. This quantity is, in my opinion, at least one-third in excess of what is necessary or even advisable. The vast population within the districts of the Companies reside in 573,792 houses, of which about a quarter (138,624) are on the constant service (December).

All the water (except about 1-19th of the total quantity—viz., that supplied by the Kent Water Company) is filtered before delivery, and no less than 82 acres of ground are covered by filter-beds for the efficient filtration of the water.

In Table I., I have stated for your information the quantities supplied monthly by the eight London Water Companies, the number of houses so supplied, and the quantity (including waste) per head of the population. One-half of the water, in round numbers, was taken from the River Thames, and the remainder from the Lea, the New River, and from chalk wells.

TABLE I.

Average Daily Supply to the Metropolis during 1879.

(Estimated Population supplied by the Eight Companies, June, 1879, 4,101,200.)

1879.	Average Daily Supply in Gallons.	Number of Houses Supplied.	Quantity supplied Daily, in Gallons, per Head of the Population.
January	137,099,205	552,657	33·2
February	129,941,893	554,227	31·6
March	129,561,672	556,767	31·5
April	128,493,940	557,660	31·3
May	132,584,711	562,058	32·5
June	134,725,591	563,000	32·8
July	135,981,121	565,798	33·1
August	140,308,815	566,755	34·2
September	139,492,704	568,773	34·0
October	134,868,826	571,608	32·8
November	131,877,956	572,505	32·1
December	138,810,978	573,792	33·8
Average	134,478,951	563,800	32·7

Note.—It is believed that these quantities are given upon the gross capacities of the pumps, and that they are consequently subject to a deduction of about 10 per cent. to arrive at the net quantities.

In Table II., I have, as usual, given the average composition of the water of the London Companies during 1879, the detailed analysis of the several samples having been month by month duly submitted to you.

TABLE II.

Average Composition and Quality of the Metropolitan Water during the Year 1879.

[The quantities of the several constituents are calculated in grains per Imperial gallon—70,000 grains.]

—	Ammonia.		Nitrogen as Nitrates, &c.	Oxygen required to oxidize Organic Matter, &c.	Total Solids.	Lime.	Magnesia.	Chlorine.	Sulphuric Anhydride	Hardness on Clark's Scale.	
	Saline.	Organic.								Before Boiling.	After Boiling.
Thames Water Companies—	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Degrees.	Degrees.
Grand Junction	0·000	0·008	0·148	0·094	21·12	7·865	0·583	1·092	1·452	14·3	4·1
West Middlesex	0·000	0·009	0·137	0·083	21·03	7·960	0·576	1·078	1·437	14·2	3·9
Southwark and Vauxhall	0·000	0 008	0·124	0·089	20·94	7·524	0·548	1·074	1·482	13·8	3·8
Chelsea	0·000	0·008	0·135	0·065	20·32	7·650	0·520	1·122	1·557	13·9	3·8
Lambeth	0·000	0·008	0·134	0·078	21·09	7·550	0·592	1·116	1·519	14·1	3·9
Other Companies—											
Kent	0 000	0 003	0·392	0·011	28·84	9 580	0·823	1·709	2·550	18·7	6·3
New River	0·000	0·005	0·145	0·045	20·84	7·753	0·535	1·092	1·395	14·1	3·6
East London	0·000	0·008	0·139	0·058	22·21	7·990	0·603	1·193	1·549	14·8	4·1

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours.

Grand Junction.—The total solid matter obtained by evaporation to dryness ranged from 19·70 grains per gallon in April, to 22·50 grains in December; the nitrogen, as nitrates, from 0·050 grain in November, to 0·165 grain in June. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in April, 0·026 grain, and the maximum in June, 0·165 grain. The samples collected in January and June contained a slight trace of suspended matter. In the other months the water was clear.

West Middlesex.—The total solid matter ranged from 20 grains per gallon in January, to 22 grains in February and December; the nitrogen, as nitrates, from 0·095 grain in July, to 0·210 grain in December. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in April, 0·015 grain, and the maximum in September, 0·159 grain. None of the samples contained any matters in suspension.

Southwark and Vauxhall.—The total solid matter ranged from 18·20 grains per gallon in January, to 23·70 grains in December; the nitrogen, as nitrates, from 0·102 grain in June, to 0·180 grain in December. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in February, 0·036 grain, and the maximum in September, 0·155 grain. The sample collected in January contained a trace of suspended matter. In the other months the water was clear.

Chelsea.—The total solid matter ranged from 19 grains in July, to 22·20 grains in February; the nitrogen, as nitrates, from 0·090 grain in August, to 0·210 grain in January. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in June, 0·033 grain, and the maximum in July, 0·105 grain. The samples collected in January and November contained a trace of suspended matter. All the other samples were clear.

Lambeth.—The total solid matter ranged from 20·20 grains per gallon in June, to 22·10 grains in December; the nitrogen, as nitrates, from 0·094 grain in July, to 0·180 grain in December. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in May, 0·036 grain, and the maximum in September, 0·148 grain. The sample collected in January contained a trace of suspended matter. In the other months the water was clear.

Kent.—The total solid matter ranged from 26·70 grains per gallon in September, to 31·10 grains in December; the nitrogen, as nitrates, from 0·300 grain in July, to 0·450 grain in November and December. The amount of oxygen needed to oxidize the organic and other matters per gallon ranged from 0·001 grain in July, to 0·039 grain in November. The samples collected were uniformly bright and clear.

New River.—The total solid matter ranged from 19·40 grains per gallon in March, to 22·40 grains in February; the nitrogen, as nitrates, from 0·120 grain in June and August, to 0·200 grain in December. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in November, 0·014 grain, and the maximum in August, 0·107 grain. The samples collected from the mains were, without exception, bright and clear.

East London.—The total solid matter ranged from 20 grains per gallon in October, to 26 grains in February; the nitrogen, as nitrates, from 0·105 grain in May and July, to 0·195 grain in December. The minimum amount of oxygen needed to oxidize the organic and other matters per gallon was in April, 0·028 grain, and the maximum in October, 0·086 grain. The samples, as collected from the Company's mains, were, without exception, perfectly bright, and free from suspended matter.

I would remark here that the year through which we have passed has been an exceptionally trying one for the Water Companies—indeed, far more trying than any of which I have had experience. The excessive rainfall has rendered the Thames more frequently than usual thick and turbid. It was to have been expected that the analyses would show a larger average amount of organic matter than in previous years, and the only thing which need surprise us is that it is not greater than results prove it to be. And yet, notwithstanding this—and I specially direct your attention to the fact—the death-rate of London for 1879 is the lowest on record.

When I write my next report it is not unlikely that the water supply will have passed out of the hands of the Companies, and the management be vested in some other body. I will not venture to predict the future of the London Water Supply, but I again repeat what I have said more than once before, that in my opinion no better sources of water can be found for the Metropolis, considering all the facts of the case, than the rivers Thames and Lea. I trust, when the Companies have passed into the hands of Government, that the general management of the several works will be as good as now, and that the change the public have clamoured for, and the more efficient working that the public expect, will be seen, not merely in lessened taxation, but in the improved health of the people and in a lower death-rate.

(Signed) C. Meymott Tidy.

THE LIVERPOOL CORPORATION (VYRNWY) WATER SCHEME.

On Monday last week a meeting of owners and ratepayers of Shrewsbury was held, to consider whether steps should be taken to oppose the Liverpool Corporation Water Bill now before Parliament. After a long discussion, a resolution was passed authorizing the Town Council to oppose the Bill, and also to raise a rate not exceeding 1½d. in the pound to pay the expenses incurred. The rate is estimated to produce £600.

A special meeting of the Cheltenham Town Council was also held to consider the same subject. The interest in the Severn claimed for Cheltenham is the right the Corporation have acquired, by the purchase of the works of the late Cheltenham Water-Works Company, to abstract 3¼ million gallons of water from the river daily, which right is only at present exercised to the extent needed for the supply of Tewkesbury. The Chairman of the Water Committee moved a resolution authorizing the expenditure of £500 upon the prosecution of the petition in opposition to the Bill, but an amendment was carried by 11 votes to 7, to the effect that no opposition should be offered to the Bill, on the ground that it did not affect the interests of Cheltenham, and that it would, therefore, be unjust to tax the town for the purpose. Notice was then given of a motion to rescind the resolution already passed to lodge a petition against the Bill.

At a special meeting of the Bewdley Town Council, Mr. Gabb, referring to the scheme, said he thought it would prove a blessing rather than otherwise to the towns on the banks of the Severn. They would have a more regular supply of water in the Severn, and if they could get 8 million gallons of water emptied into the river in dry seasons they would not be able to walk over dryshod. Then they would have less flooding, because the Liverpool Corporation would be compelled to store the water during the flood season. After some discussion, a resolution was proposed that the Liverpool Corporation Water Bill be opposed by the Council, the cost of opposition being limited to a sum equal to a rate of 3d. in the pound. Only 7 members voted in favour of the motion, 4 remaining neutral, and, as the resolution did not receive the support of a necessary majority, the whole matter has fallen through.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

The Fortieth Quarterly and Tenth Annual Meeting of this Institution was held at the Mitre Hotel, Manchester, on Saturday, the 28th ult. The attendance of members was very large. Visitors from kindred Associations were present, including Mr. Mitchell, the President of the West of Scotland Association of Gas Managers.

The minutes of the previous meeting and the report of the Committee for the past year were read.

The election of new members and the other preliminary business having been completed, the retiring President, Mr. T. Newbigging, introduced Mr. William Carr, of Halifax, the President for the ensuing year, who thereupon took the chair. Mr. J. Chew, of Blackpool, was elected Vice-President; and Messrs. Barrett, Manchester; Coles, Todmorden; and Veevers, Dukinfield, Members of Committee in place of those retiring. Mr. Robert Hunter, the Honorary Secretary, was re-elected, as were also Messrs. Lord and Smedley, the Auditors.

The President then proceeded to deliver his Inaugural Address, dealing with many important matters, and it was listened to by an appreciative audience.

Papers were afterwards read by Mr. Hawkins, of Wigan, "On Gas Purification;" and by Mr. Chew, jun., of Blackpool, "On Three Months Experience of the Working of the Electric Light."

The following articles were on exhibition during the meeting:—A Siemens electric lamp; a section cut from a pipe socket, showing Painter's hydrostatic joint; a sample of Spence's new metal for pipe-joints; and a model of Tangye Brothers and Holman's anti-dip pipe and valve.

We shall publish the proceedings *in extenso* in future numbers of the Journal.

WAKEFIELD GAS COMPANY.

The Half-Yearly Meeting of this Company was held on Monday, the 16th ult.—Mr. W. Statter, J.P., in the chair.

The Secretary and Manager (Mr. J. W. Whitaker) having read the notice of meeting, the report of the Directors for the past six months was presented. It stated that the amount divisible amongst the Proprietors was £5523 19s. 1d., out of which the Directors recommended the payment of dividends for the half year at the rate of 11 per cent. on the original shares, 8¼ per cent. on the B 5th shares, and at the rate of £7 14s. per cent. per annum on the new £10 shares, all clear of income-tax. It was further stated that the extensions to the purifying plant had been thoroughly completed and in use during the past half year, and that the works generally were in good order.

Dr. *Revenue Account, for the Half Year ended Dec. 31, 1879.* Cr.

Manufacture of gas—				Sale of gas—		
Coals, including dues, &c.	£2,995	16	5	Common gas	£8,107	4 3
Purifying materials	242	16	8	Public lighting and under contracts	756	15 0
Salaries of Engineer, &c.	100	0	0	Rental of meters	353	9 9
Wages and gratuities	797	10	6	Residual products—		
Repair and maintenance of works and plant	802	17	3	Coke, less labour and cartage	1,136	15 4
Distribution of gas—				Tar, " "	1,000	13 3
Salaries of Inspectors, &c.	137	14	3	Ammoniacal liquor	1,318	19 1
Repair, &c, of mains and services	147	12	3	Rents	53	3 0
Repairing, renewing, and refixing meters	63	18	4	Transfer fees	2	2 6
Repairing public lamps	53	16	3	Fitting and service-laying account	42	1 8
Rates and taxes	640	10	4	Interest allowed on banking account	10	3 5
Management—				Law charges recovered	1	7 0
Directors allowances	200	0	0			
Salaries of Secretary and Clerks	79	2	0			
Collectors salaries	117	10	0			
Stationery and printing	35	9	6			
General charges and incidentals	19	1	3			
Auditors fees	25	0	0			
Bad debts	100	0	0			
Superannuation allowance	100	0	0			
Deficiency of gas exhibition	17	11	3			
Total expenditure	£6,677	6	6			
Balance	6,105	7	9			
	£12,782	14	3		£12,782	14 3

The Chairman moved the adoption of the report and accounts. He said he might supplement what was stated in the report by saying that the Company's works were not only in good order, but had been very efficiently worked. The increase in the quantity of gas made was something considerable. During the last half year 77,371,000 cubic feet of gas had been made, being an increase of 5,458,000 feet over the corresponding half year of 1878. The increase in the first half of 1879 was about 6,500,000 feet, or for the whole year 12,137,000 feet, which amounted together to an increase of 9 per cent. This increase in the quantity of gas made compelled the Directors to consider the propriety of increasing their storeage room. At present they had room for 800,000 feet, and he believed it was an axiom that if they could store one day's supply they could store enough; but during the past winter they had exceeded 800,000 feet a day on thirteen occasions, and one day they supplied as much as 850,000 feet. The Directors were, therefore, making preparations for the erection of another gasholder, and in the course of a month the contracts would be let. The proposed new holder would involve an addition to capital of £10,000 or £12,000; so that the Shareholders might expect another call to be made upon them before very long. The illuminating power of the gas had been maintained at 17½ candles, and he believed there had been no complaint either as to the quality or the quantity of the supply. After paying the dividends as recommended in the report, there would be a surplus of £1258 to add to the reserve-fund, which would then amount to £6515.

Mr. Briggs seconded the motion, and it was adopted.

The Chairman then proposed the payment of the dividends, and the motion was seconded by Alderman Howden. After which,

On the motion of Mr. B. Watson, seconded by Alderman Moorhouse, a vote of thanks was given to the Directors, and the meeting ended.

Aldershot Gas and Water Company.—The half-yearly meeting of this Company was held on Wednesday last, when the Directors report recommended that a dividend of 3 per cent.—being at the rate of 6 per cent. per annum—be declared, free of income-tax, on the ordinary shares. In reference to the gas-works, the report stated: "The increase in the consumption of gas is very fair. During the half year the duplicate 8-inch main from the gas-works has been carried into the centre of the town, and some further extensions into the new roads have been lately laid out." In regard to the water supply, it was stated: "There is also a moderate increase in the sale of water. About a mile of new mains have been laid, and contracts have been made for a duplicate pumping-engine, and for another tube well to the chalk, the first one having been only a test, and not being sufficiently large to supply the amount required." The new capital to pay for the work being carried out has been raised by the issue of 6 per cent. preference shares of £10 each, at the price of £12.

SOUTH SHIELDS GAS COMPANY.

The Ordinary Meeting of this Company was held on Thursday last—Dr. R. Wallis, J.P., in the chair.

The Secretary (Mr. J. H. Penney) read the notice convening the meeting, after which the following report was submitted:—

The Directors beg to submit to the Proprietors the accounts for the half year ending Dec. 31 last.

The balance of the profit and loss (net revenue) account amounts to £4196 5s. 9d., out of which the Directors recommend the payment of a dividend for the half year ending Dec. 31 last at the rate of 7 per cent. per annum.

The gas consumption for the past half year was 75,187,700 cubic feet, which shows an increase over the corresponding period of last year of 6,707,800 cubic feet.

The Jarrow new works have been in operation since the last meeting. The Engineer's patent stoking machine has been at work during the same period, and has given great satisfaction.

Your Directors have effected a great saving by completing the contracts for a new gasholder and retort-house roof, before the rise in the price of iron.

The Directors beg to recommend a reduction of 3d. per 1000 feet in the price of gas, to take effect from the beginning of the present year. This will make the prices within the boroughs of South Shields and Jarrow, after deducting the usual discounts, about 2s. 9d., 2s. 8d., 2s. 6½d., and 2s. 5d. per 1000 feet respectively.

The retiring Auditor is Mr. John Ridley, who, being eligible, offers himself for re-election. The Directors retire from office and seek re-election.

Dr.—*Capital Account, for the Half Year ended Dec.* 31, 1879.

	Expenditure to June 30, 1879.	Expended this Half Year.	Total to Dec. 31, 1879.
To Expenditure to June 30, 1879	£111,904 10 0	—	£111,904 10 0
Since that date—			
New buildings, manufacturing plant, machines, storeage works, &c.	..	£8,928 12 11	
New mains and service-pipes (not being in place of old ones)	..	191 8 10	
New meters (not in place of old ones) including fixing	..	151 7 5	
Costs of promoting special Act	..	1,909 0 9	
			11,180 9 11
			£123,084 19 11

Cr.—*Capital Account.*

	Certified Receipts to June 30, 1879.	Receipts during this Half Year.	Total Receipts to Dec. 31, 1879.
By £80,000 9 per cent. stock and share capital, now converted into South Shields Gas Consolidated Stock, at 7 per cent.	£91,500 0 0	..	£91,500 0 0
New stock £8080 0 0			
Less calls unpaid 530 2 0	..	£7,549 18 0	7,549 18 0
Premiums on issue of new stock	..	2,107 17 6	2,107 17 6
Loans on mortgage	19,800 0 0	..	19,800 0 0
			£129,957 15 6
Balance	..	..	2,127 4 5
			£123,084 19 11

Dr. *Revenue Account, for the Half Year ended Dec.* 31, 1879. Cr.

Manufacture of gas—		Sale of gas—	
Coals, including dues, &c.	£3,548 4 11	Common gas	£10,706 19 11
Purifying materials, &c.	214 14 4	Public lighting and other contracts	1,837 4 1
Salaries of Engineer and Officers at works	543 4 3	Rental of meters	615 3 11
Wages and gratuities	1,053 3 10	Residual products—	
Repair and maintenance of works and plant	2,683 12 6	Coke, less labour and cartage	886 9 11
Distribution of gas—		Tar	805 2 10
Salaries of Inspector, &c.	166 6 8	Sulphate of ammonia	534 2 8
Repair, maintenance, and renewal of mains and of service-pipes	219 15 11	Rents	68 1 4
Repairing, renewing, and re-fixing meters	320 4 1	Transfer fees	0 12 6
Lighting and repairing public lamps	458 0 1		
Rents	159 18 0		
Rates and taxes	406 7 1		
Management—			
Directors allowances	140 14 0		
Salaries of Secretary, Accountant, Clerks, &c.	287 15 0		
Collectors commission	122 2 0		
Stationery and printing	60 11 7		
General charges and incidentals	129 14 11		
Auditors	21 0 0		
Law charges	18 16 7		
Bad debts	12 18 11		
Total expenditure	£10,597 5 4		
Balance	4,886 11 10		
	£15,483 17 2		£15,483 17 2

The Chairman said since the Shareholders last met the Company had obtained the Royal Assent to the Bill they promoted in Parliament last session. They had secured extended powers under the Act, and by it they were placed in a different position in regard to gas legislation. They would all have received a copy of the report and balance-sheet, and from it they would perceive that the accounts were presented in a more comprehensive manner than formerly. This, of course, entailed considerable extra work on their Secretary and other officials. As they were aware, under the new Act of Parliament the old Shareholders of the Company were not now in a position to divide any new capital that might be required *pro ratâ* according to their interest in the Company, and the result was that the shares had to be offered for sale by public auction. They had already had one sale of shares, and the shares met with a very ready sale, realizing good prices. This he considered was one of the surest signs that the Company were in a sound and prosperous position. They had recently passed through times of great depression in a commercial point of view, but the Company had been enabled to maintain their position amongst other mercantile concerns in the country. This depression they had reason to believe had passed away, and there was seen a silver lining in the dark cloud, so that they might look forward to a new state of matters in regard to the development of the national industries of this country. They, in fact, saw on all hands a great revival of trade, and he was glad to observe that the receipts of the River Tyne Commissioners for dues had gone up 12 per cent. The iron and coal trades were also giving indications of being once more prosperous. With regard to the coal trade, he might say that the Directors had secured contracts, on most favourable terms, for the ensuing year—in fact, he might say that since they signed their contract coal had advanced from 1s. to 1s. 6d. per ton. These were all signs of the times, and he was proud to say the Company were keeping pace with them. Comparing the corresponding half of the previous year with that of last year, they were in a most favourable position. Respecting the sale of gas, in comparing the half year of 1878 with that just closed, he found they had sold 7 millions of cubic feet of gas more than in the corresponding half of the previous year, and in money value the increase was £994. These were all just sources of congratulation. Respecting the recent sale of new stock, he must say that the regulations of the Legislature were very strict, although at the same time fair and just. Instead of dividing the stock among themselves at par, the shares were sold at a premium. The Shareholders, however, did not altogether lose the benefit, seeing that the premiums realized went to increase the capital without bearing interest, and thus tended towards the reduction of the mortgage debt. As to the insurance of the works, under the new Act they had an insurance-fund to which they could devote surplus money equal to one-twentieth part of the paid-up capital. The reserve-fund was at its maximum, and, therefore, the regulations of the Act did not affect it. According to the terms of this Act, the Shareholders became entitled to 5s. for every 1d. per 1000 feet reduction in the price of gas; and they would see that the Directors had in their wisdom reduced the price of gas 3d. per 1000 feet, so that the Shareholders would in the next half year receive 15s. per cent. additional dividend. They had some difficulty in coming to this conclusion, but considering that they now had £994 to carry over to the next half year, and that they might fairly expect there would be an increased consumption of gas owing to the revival of trade, they saw their way to make the reduction. He then referred to the Jarrow works, and the successful working of Mr. Warner's patent stoking apparatus, and said he had no doubt that when the retort-house was in full operation, Mr. Warner's estimate of the saving that would be effected was rather under than over stated. They would, he felt sure, save in the retort-house at least £1000 a year by the use of the machine. He concluded by moving the adoption of the report.

Mr. Henderson said he had great pleasure in seconding the motion It must be indeed gratifying to the Shareholders to have such works as they had at Jarrow, which were second to none in the kingdom. He thought that they might congratulate themselves upon their success.

Mr. Smith said he was very much gratified at witnessing the patent stoking machine at work at Jarrow a few days ago. He considered that the machine was quite a success, and it must have cost Mr. Warner a great amount of labour to bring it to such perfection.

Mr. Bowman said he thought the Directors ought to be congratulated upon the step they had taken in reducing the price of gas. The reduction would be most acceptable to both large and small consumers.

The motion having been adopted,

Mr. Hall proposed that a dividend on the consolidated stock of the Company be declared at the rate of 7 per cent. He referred to the consideration which the Directors had given respecting the reduction in the price of gas, and alluded to the charges made by other Companies.

Mr. Ridley seconded the proposition, which was carried.

Mr. Nelson moved that the fees of the Auditors be increased from £42 to £50 per annum. The Auditors, he said, under the new Act of Parliament, had increased duties, and it was only right that they should have additional remuneration.

Mr. Bowman seconded the motion, which was also carried, and

Mr. Ridley returned thanks on behalf of himself and Mr. Chapman.

Mr. Moore then proposed a cordial vote of thanks to the Directors for their services during the past half year. The proposition, he said, needed no commendation, as the result of their labours had been so satisfactory. The Directors of the Company were gentlemen who had a very large and comprehensive understanding of the duties entrusted to them. For his own part he looked upon the Company as the trustees for the public, as from what he had seen he believed the Directors themselves considered they had a duty to perform to the public. He had to congratulate them upon the recent reduction in the price of the gas. Gas was now one of the essentials of life, and therefore it was only right it should be supplied at the lowest rate. According to the Company's new Act of Parliament, the larger the dividend which the Shareholders were entitled to receive, the greater was the reduction in the price of gas the public were entitled to.

Mr. Duncan seconded the motion, and said the Directors had undoubtedly given great care and anxiety to the interests of the Shareholders in promoting the welfare of the Company. It was indeed most gratifying to hear from Mr. Henderson that the Directors were satisfied with what they had done.

The vote of thanks was carried, and Mr. Henderson responded; after which the Directors were re-elected for the ensuing half year, and the proceedings terminated with a vote of thanks to the Chairman.

PETERBOROUGH GAS COMPANY.

The Half-Yearly Meeting of this Company was held on Tuesday, Feb. 17—Mr. W. Harris in the chair—when the Directors reported that during the past half year the consumption of gas had been somewhat less than in the corresponding period of 1878, and this, together with the reduction in price effected from the 1st of July last, had prevented so large a profit resulting from the six months working as during the previous period. The receipts for the last half year amounted to £6434 4s. 1d., of which £5054 5s. 10d. was from the sale of gas. The manufacturing charges were £2433 9s. 9d.; repairs and maintenance, £405 16s. 11d.; other miscellaneous expenses, £1110 16s. 10d.; so that, after making allowance for interest on mortgages, bad debts, and stocks in hand, there remained a sum of £2444 16s. 3d. to be carried to profit and loss account. This added to £62 10s. 3d., brought forward from the previous half year, made a total of £2507 6s. 6d.; from which, after providing for the payment of the preferential dividend on the 5 per cent. new preference A shares, the Directors recommended the payment of the maximum dividend for the half year on the remaining share capital of the Company, and a back dividend at the rate of 1 per cent. per annum, or 2s. per share on the ordinary shares of the Company, for the year ending Sept. 30, 1873, free of income-tax. The Company's capital consists of £59,150 of shares, and £6446 10s. of mortgages; the expenditure on capital account to date being £622 less than the receipts.

The Chairman, in moving the adoption of the report and accounts, said that, notwithstanding the very great commercial depression which had prevailed all over England, and indeed all over Europe, the prosperity of the Company had not been greatly hindered. The difference in the amount of gas-rental between the half years ending Dec. 31, 1878, and Dec. 31, 1879, was £354 17s. 9d. in favour of the former period, which was altogether an exceptional half year—the winter set in very early, and it was of remarkable severity, so that the consumption of gas was much larger than usual. It must also be remembered that during last half year the reduction in the price of gas had taken effect to the amount of £246 10s., being the third reduction within three years. When the Company commenced the manufacture of sulphate of ammonia, the enterprise was regarded with some degree of doubt by several of their friends, whose opinions were entitled to respectful consideration on their part. The Directors thought, however, the result would be held to justify their

action, for the first year's working under their Engineer and Manager (Mr. G. E. Stevenson) showed a net profit of £491 13s. 8d., whilst previously one year's sale of ammoniacal liquor realized only about £150.

Mr. E. VERGETTE seconded the motion, which was agreed to.

The CHAIRMAN proposed that the dividends for the half year, as recommended in the report, be declared.

This proposal was seconded by Mr. T. W. HOLDICH, and carried.

Mr. REDHEAD proposed, and Mr. T. W. HOLDICH seconded, that the salary of the Secretary (Mr. J. Graves) be increased.

This was agreed to; and a vote of thanks was passed to the Chairman, who responded, and the meeting terminated.

NEWPORT (MON.) GAS COMPANY.

The Half-Yearly Meeting of this Company was held on Monday last week—Mr. T. GRATREX in the chair.

The SECRETARY (Mr. E. F. Marfleet) read the notice convening the meeting, and the Directors report was taken as read. It recommended the payment of the usual dividends for the last half year; and stated: "The Directors have determined to commence a depreciation-fund for the works on leasehold land. A new purifying-house has been erected, and the new purifiers, referred to in former reports, have been carried out, and, with the other works of the Company, are in full working order. A new and enlarged station-meter has been erected, and is now in use. The Directors do not intend erecting any additional works on the present site. The purchase of the additional freehold land is progressing, and the capital produced from the recent call will pay the remainder of the purchase-money."

The Company's receipts during the past six months amounted to £9484; and the expenditure to £6928; leaving a profit of £2556 to carry to net revenue account, to the credit of which there was already a sum of £2869 of unappropriated profits of previous half years. The capital of the Company is £61,250 in shares, and £10,750 of borrowed money, while the expenditure to date of account exceeded these sums by £1808. The reserve-fund amounts to £4000; and the depreciation-fund, which is just commenced, to £200.

The CHAIRMAN having moved, and Mr. JACKSON seconded, the adoption of the report,

Mr. CHRISTOPHERS asked, in regard to the depreciation-fund, why it had not been commenced before.

The SECRETARY said they were not able to do so till their Act of 1875.

The motion was then agreed to.

The CHAIRMAN next moved the following resolution—"That dividends at the rate of 5 per cent. on class A stock, 3¾ on class B stock, and 3½ on class C shares, for the half year ending Dec. 31, 1879, be declared."

Mr. E. J. PHILLIPS, who seconded the motion, said that the accounts for the last half year were not so satisfactory as those of the three previous half years; yet, in the various departments, there had been a saving. In the item of coal there had been a saving of more than £400; in purifying materials, about £120. There had also been a saving in the salaries of officers, maintenance of the works and plant, and in almost every other department. In spite of these facts, the balance only showed an amount of £2556 3s. 11d. In the half year ending June, 1878, it was £3613; at December, 1878, £2606; while at June, 1879, it was £2680. One reason why the balance was not so good was the fact that the rates and taxes charged were very high. There had been a dispute between the Company and the Assessment Committee of the Guardians, but he believed the matter would be amicably settled. The gas supplied during the half year had been of good quality, as tested by the officer of the Corporation. The illuminating power had been kept up to 15½ candles, and there was no trace of sulphuretted hydrogen.

Mr. WILLIAMS asked whether the depressed times had had any effect as to the collection of the gas-rates.

The CHAIRMAN: Yes, certainly; but we have much to be thankful for.

The resolution was then carried, and this was all the business of the meeting.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

The Annual General Meeting of this Company was held on Tuesday, the 24th ult.—Mr. R. VINT in the chair.

The SECRETARY (Mr. J. W. Sutherland) having read the notice convening the meeting, the following report was presented:—

The new pumping-station at Dalton is now completed, with the exception of the removal of the temporary plant from the ground, which is being proceeded with as quickly as possible. The engines are in full working order, and the supply of water obtained has been highly satisfactory and of excellent quality.

Your Directors recommend that a dividend of 5 per cent. on the ordinary and preference stocks of the Company, for the half year ending Dec. 31, 1879, clear of income-tax, be declared, making, with the interim dividend paid on the 1st of September last, 10 per cent. for the year; also that interest at the rate of 5 per cent. per annum be paid on the amount called up on shares allotted, Sept. 3, 1875.

The retiring Directors are Messrs. Vint, Stokoe, Richardson, and Hall, and the retiring Auditor is Mr. H. G. Armstrong; all of whom are eligible for re-election.

Revenue Account, for the Year ending Dec. 31, 1879.

Dr.		Cr.	
Wages	£3,911 12 11	Balance from 1878	£27,170 2 10
Coals, including carriage	2,350 16 9	Less dividend declared at last annual meeting	16,379 16 1
Rates and taxes	4,175 10 0		£10,790 6 9
Salaries and Auditors	2,182 10 0		
Directors	500 0 0		
Repairs	1,948 5 0	Water-rents, interest, &c.	47,169 7 11
Oil, tallow, &c.	251 6 8		
Printing, stationery, &c.	165 12 2		
Incidentals	404 0 0		
Interest on bonds	162 1 8		
	£16,072 4 2		
Interim dividend	16,562 17 2		
Balance	25,324 13 4		
	£57,959 14 8		£57,959 14 8

The CHAIRMAN, in moving the adoption of the report, said the Shareholders would observe from the accounts that £3911 had been paid for wages last year, which was a decrease of £214 on the previous year. The item of coals, cartage, and carriage amounted to £2350, which was also a decrease of about £130. On oil and tallow there was a decrease of upwards of £50, and for repairs £1948 had been paid, being less than the previous year by £1632. The other items were about the same as last year. The total working expenses for the year just passed were £16,072, being about £1800 less than in the previous year. Of course, as they would observe, the chief difference was in the item of repairs. With regard to the work that had been done during the year, at Dalton a third large cooling-pond had been made, and a lot of heavy work completed, and the engines put into proper working order; and the Directors were very happy to find that the results were likely to prove satisfactory. However, as their Engineer was present, he (the Chairman) should leave it to him to refer more particularly to that point. During the past year they had laid new mains to the extent of 3340 yards, and put in 778 new service-pipes, which generally meant so many new customers. They had also taken in the new district of Washington and Usworth, which they supplied from their new reservoir on the top of Humbledon Hill. He believed the supply of water obtained from the Company would be a great boon to the district. They had raised during the year 1556 million gallons of water, and delivered it to their customers at the rate of more than 4,250,000 gallons per day. The Shareholders would be aware that during the last three or four years the district, in common with the kingdom generally, had been labouring under an extraordinary depression of trade. The consequence was that in the last year the Company, for the first time since its commencement, had a small decrease in the annual revenue. On the other hand, he had the cheering information to give the Shareholders that they had received on account of domestic supply more than in any previous year, and in the last quarter for meter-rentals, from chemical and other works on the Tyne and elsewhere, they had an increase of income over the corresponding quarter of the previous year of £442, so that this year they had reason to believe they would be able to show a very considerable increase under this head. The Company were now in a position to supply any demand that could possibly arise for many years to come. It was also satisfactory to find that the water was everything that could be wished. There was a balance available for dividend of £25,324, and they would be able to carry forward about £9000.

Alderman GLOVER, in seconding the motion, said he thought the Company would compare favourably with any company in the kingdom. He regarded the satisfactory increase in the revenue from meter-rents during the past quarter as the surest test of the increasing prosperity of the Company.

Mr. T. HAWKSLEY, C.E. (the Company's Engineer) said he did not know that he had so much to communicate to the Shareholders as he had been able to tell to them on many previous occasions. There was one thing they would perhaps be pleased to hear, and this was that his labours in the outlay of their money had very nearly, if not entirely, come to a conclusion. But perhaps this was not a matter to be altogether rejoiced at, because when the Engineer ceased to spend the Shareholders money, it showed that they had no further means of investing it. As a Shareholder, he should be very glad to hear that they had it in view to spend a good deal more money, because he knew very well that their revenue would very largely increase as soon as trade revived, and they would have the means of making much larger dividends—not in percentage, but in actual amount—if they had more means of investment. He would revert to one matter on which he had the greatest pleasure in making a statement, and that was the very admirable manner in which the undertaking was managed by the Directors and Officers. The Shareholders would see from the accounts that the expenditure on the working of their very large undertaking was only about 33 per cent. on the revenue. Now, there were very few similar concerns where the water was pumped from such a great depth, and a constant supply given, in which the expenditure was not at least 40 per cent. Here, by the exceedingly careful, and at the same time not illiberal management of their Board, the expenditure was practically some 6 or 7 per cent. less than in most places. That, of course, was only saying in other terms that they had good security for their investment, because with so low an annual charge, and with so good a prospect as they had at the present time of increasing their revenue by the extension of property in the district they occupied, and by the revival of trade, and in consequence of a very small future expenditure of capital being required, inasmuch as they were capable certainly of supplying 8 million gallons of water per day now, when only an average of 4½ million gallons was required—for all these reasons he said their property was perfectly well assured, and they and the public also had a very excellent future before them. He had during his lifetime been concerned in the construction of rather more than 100 water-works, and was connected at the present time with a very large number of undertakings similar to this in different parts of the kingdom; but he did not know one which had a better, a more assured future before it than this Company had.

The motion was carried unanimously, as was also one for the declaration of the dividends recommended in the report. The retiring Directors and Auditor were then re-elected, and the business closed with the usual vote of thanks to the Chairman.

CHATHAM AND ROCHESTER WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held on Tuesday, Feb. 17—Mr. J. BAIRD presiding.

The SECRETARY (Mr. S. M. Heckford) read the following report for the six months ending Dec. 31, 1879:—

The Directors have the gratification to report the continued progress and prosperity of the Company. Shortly after the last report, the new steam-pump therein referred to was obtained to assist in pumping out the water from the new well, &c., and after considerable trouble and expense this was ultimately accomplished, so that the workmen were able to get down and fix the sluices which shut off and control the water flowing from the new headings into the well where the new pumps are to be fixed. This well, which is 7 feet in diameter, has been carried down in brickwork to the depth of 150 feet, and a large chamber for the air-vessel has since been constructed and is now ready for the brick foundations to be put in, previously to fixing the air-vessel and iron girders for the pumps.

The Directors recommend that a dividend at the rate of 7 per cent. per annum (free of income-tax) be declared upon all shares fully paid up, or the calls due in respect of such shares prior to Dec. 31 last, in proportion to the length of time which such shares or calls have been paid respectively, and that the balance of the revenue account be carried forward to the next half year's account.

[The statement of accounts showed that £50,376 had been received on capital account, together with £9305 placed to capital as a reserve-fund for contingencies. The revenue account showed that £5600 had been received as revenue during the past half year, against which the expenditure included £763 for salaries and wages; £349 for rent, rates, and taxes; £1137 for coal and oil; and £1231 for repairs and renewals; leaving, after the payment of miscellaneous charges, £1485 available as dividend for the past half year. The reserve-fund of the Company amounts to £9305.]

The CHAIRMAN moved the adoption of the report, and in doing so described the additional works which had been undertaken to meet the constantly increasing requirements of the Company.

The motion having been seconded by Mr. HODGES,

Mr. STIGANT criticized the statement of accounts, which he contended was misleading, for it showed that the Directors proposed to pay a dividend of 7 per cent. out of a profit of £1485, which would really pay a dividend of 5 per cent. only. He moved, as an amendment, a dividend at that rate only.

The CHAIRMAN said if Mr. Stigant had looked at the profit and loss account, he would have found that there was a balance carried forward at the end of the previous half year of £3111, thus making £4596 available to be appropriated as dividend.

Mr. PRALL (the Company's Solicitor) also pointed out the fallacy of Mr. Stigant's argument as to the amount for disposal as dividend, saying he appeared to have overlooked the large amount brought forward from the previous half year.

Mr. WARNE said he was quite sure the Shareholders would not adopt the timid suggestion made by Mr. Stigant, who appeared to have altogether missed the point in his statements.

The amendment was not seconded, and the report and balance-sheet were adopted.

The three retiring Directors—Alderman Tribe and Messrs. Brock and Hutchison—were re-elected, as was also Mr. G. Bolton, one of the Auditors, a further sum of five guineas each being awarded to the Auditors for their additional services.

A vote of thanks to the Directors, Secretary, Auditors, and other Officials of the Company, brought the proceedings to a close.

COLNE VALLEY WATER COMPANY.

The Twelfth Half-Yearly General Meeting of this Company was held at the Charing Cross Hotel on Monday, the 23rd ult.—J. R. Hollond, Esq., in the chair.

The Clerk (Mr. W. Verini) read the notice convening the meeting, and the following report of the Directors was presented:—

The Directors beg to present their half-yearly report and statement of accounts to the Shareholders.

During the half year the water-rental amounted to £1443 11s. 6d., being an increase of £196 8s. 6d. as compared with the corresponding period of 1878. Water has now been laid on to other houses and cottages, representing an additional water-rental of £90 19s. 6d. per annum.

The long-continued bad weather rendered it impossible to execute all the orders that were on hand for supply to houses, or the receipts would have been considerably increased. The consequence was that the expenditure for the half year slightly exceeded the income.

The Directors regret to have to announce the loss they have sustained in the death of their late Secretary, Mr. Philip Verini, who by his untiring energy and zeal rendered invaluable service to the Company.

John F. Bateman, Esq., Stephen P. Kennard, Esq., and Alexander Sim, Esq., retire from the directorate, but offer themselves for re-election.

B. D. Kershaw, Esq., retires from the auditorship, but offers himself for re-election.

Capital Account on Dec. 31, 1879.

Dr.				Cr.			
Capital—				Expenditure as per last account	£121,496	3	1
10,000 shares, at £10 per share paid up	£100,000	0	0	Expenditure for half year ending Dec. 31, 1879	514	0	10
44 new shares, at £10 per share paid up	440	0	0		£122,010	3	11
Debentures	25,000	0	0	Balance carried to general balance	3,429	16	1
	£125,440	0	0		£125,440	0	0

Revenue Account, for the Half Year ending Dec. 31, 1879.

Engine working expenses—				Water-rates	£1,443	11	6
Fuel	£131	5	1	Rent of water-meters	43	5	3
Oil	8	0	0	Transfer fees	2	7	6
Tallow	6	19	4	Sale of gravel and refuse lime	46	8	7
Waste	2	3	10	Balance	51	8	6
Sundries	0	7	10				
Wages	205	2	8				
Pipe system expenses and repairs	45	14	7				
Lime	49	4	4				
General working expenses and repairs	73	18	1				
Insurance of boilers, &c.	31	0	0				
Stable expenses	26	0	2				
Meter repairs	2	4	11				
Salaries to Secretary and other officials	178	18	0				
Rent, &c.	34	2	4				
Stamps, stationery, and printing	29	10	4				
Sundries and petty expenses	12	14	11				
Advertising and incidental expenses	5	19	9				
Law expenses	3	8	10				
House services, &c.	15	5	5				
Commission to Collector	34	5	3				
Rates and taxes	26	2	7				
Interest on debentures, &c.	664	13	1				
	£1,587	1	4		£1,587	1	4

The Chairman, in moving the adoption of the report, said it was satisfactory that the Directors could chronicle some progress. The increase in the water-rates for the last half year, as compared with the corresponding half of the previous year, amounted to about £196, but this did not show sufficiently what an increase there was as compared with the previous year. If they took the whole year of 1878, and compared it with the whole year of 1879, they would find that the increase in the water-rates amounted to about £544. Of course they could wish that the progress of the Company was rather more rapid, but it had been delayed by a variety of causes, the chief of which might be attributed to the weather. When the Directors presented their report made up to the previous half year, they had to exercise the Englishman's privilege of complaining of the weather, and he thought they might say that since June 30, 1879, the weather had not improved, and that in the latter half of the year it was as bad as it had been before, and consequently there was not the same inducement for their *clientèle* to take the water. He thought that if they had a thoroughly dry summer, as in former years, the Shareholders would find there would be a very rapid increase in the applications for water. As a matter of fact, the Directors found on looking into the subject, that not nearly half the houses in their district were as yet supplied with water. On the other side of the accounts it would be seen that the Directors had effected several economies. Last November they gave up their London offices, which saved £60 a year, and they had now established their office at Bushey. There had, besides this, been a certain saving in the salaries paid. The result of all this was that they hoped next half year to be able to show a balance on the right side. As it was, they had hitherto had nothing but balances on the wrong side, and though the amount shown on the present occasion was considerably less than in the previous half year, it was still on the wrong side. He was glad to say that the character of their water remained as good as ever. In the various reports issued by Dr. Frankland, they found that the Colne Valley water stood first for purity. This was the case in July and August; in September, however, it stood second, but in the following two months it stood first again, so that in the majority of the months of the year the Colne Valley Water Company stood at the head of the list. He then referred to the very great loss sustained by the Company by the death of Mr. Philip Verini, their late Secretary, whose services to them he warmly eulogized, remarking that the Board regarded Mr. Verini's death as a personal loss. They had not thought it necessary to appoint a successor, but their late Secretary's son, Mr. William Verini, now acted as Clerk to the Company. The Directors believed that Mr. W. Verini possessed considerable knowledge of the affairs of the Company, having assisted his father a great deal, almost from the formation of the Company, and they thought they could not have confided to better hands the post of Clerk.

Mr. Benskin thought that the price paid for fuel was high. The oil bill, too, was very heavy.

The Chairman said they had a list of the prices paid last half year. Coal in July was 16s. 7d. per ton; in August, 18s. 3d.; in September, October, and November, 17s. 8d.; and in December, 18s. 6d. It was also 17s. 8d. in January. In July and August coke cost them 16s. 8d. per ton; in September and October, 14s. 8d.; and in November and December, 14s. 2d. The oil was 4s. per gallon. He saw that in the half year ending Dec. 31, 1878, they paid £7 11s. 4d. for it, and in the past half year £8 so that did not seem to be a very large increase; and the prices he had mentioned included the cost of cartage and the City dues. The Company used the Ebbw Vale steam coal, mixed with coke. The Directors had tried to contract for coal by the year, but the contractors had declined.

Mr. A. Sim seconded the motion, and it was carried unanimously.

The retiring Directors and Auditor were then severally re-elected, and the proceedings terminated.

THE GAS SUPPLY OF CORK.

From the report presented to the Corporation of Cork, at their last meeting, by the Accountant appointed by them to examine into the accounts of the Cork Gas Consumers Company, it appears that the nominal capital of the Company is £150,000—£146,205 being registered; and of this amount £135,413 has been paid up. The debentures outstanding during the past six months amounted to £10,988 11s. 8d., and the sums borrowed from other sources to £10,332 5s. 11d., making a total working capital of £156,733 17s. 2d.

The total receipts from revenue for the last six months amounted to £24,480 10s. 7d., or an increase of £949 4s. 4d. over the corresponding period of the previous year. The working expenditure for the same time amounted to £15,701 18s. 11d., or an increase of £464 17s. 2d., and the net revenue to £8778 11s. 8d., or an increase of £484 7s. 2d. over the corresponding period of the previous year. The increase in revenue consisted of £605 6s. 5d. rentals, and £343 11s. 11d. residuals. The renewal of retorts and the re-construction of a gasholder caused the increased expenditure.

The quantity of gas manufactured during the six months was 98,253,000 cubic feet, of which 71,401,100 cubic feet were sold to consumers within the borough at 4s. 6d. per 1000 feet, and 3,231,500 cubic feet at 5s. per 1000 feet to consumers outside the borough. The quantity for public lighting was 9,203,400 cubic feet at 4s. 6d. per 1000 feet. This makes a total of 83,836,000 cubic feet consumed, against 98,382,000 cubic feet supplied, showing a loss by leakage of 14,546,000 cubic feet, which is equal to 14·78 per cent. on the supply, being 6 per cent. less than the previous half year.

The quantity of coal used during the six months was 11,015 tons, comprising 7754 tons of Newcastle, 3187 tons of Welsh small, and 74 tons of cannel, at an average price of 12s. 11¾d. per ton. This shows a production of 8919·895 cubic feet of gas per ton of coal carbonized. The cost of production per 1000 feet, including all charges and dividends on paid-up share capital, was 39·816d., or 3s. 3¾d.

The quality of the Company's gas, according to the testing apparatus at the works, was equal in intensity to 16 sperm candles, the required parliamentary standard being 14 sperm candles.

The outlay on permanent investment for the six months was £1703 19s. 11d., which account now stands at £150,812 2s. 4d.

The reserve-fund, which on Dec. 31, 1878, amounted to £9105 4s. 7d., was further augmented by £1715 19s. 11d. It now stands at £10,821 4s. 6d.

After paying £233 10s. 10d. interest on debentures; £227 1s. 11d. interest on bank overdraft and other loans; £5416 10s. 4d. as dividend, at 8 per cent., on paid-up share capital; £306 13s. 4d. for charges and insurance; £438 4s. written off the suspense account; £700 added to the depreciation-fund; and reserving £348 16s. 6d. to meet contingency of bad debts; the surplus net profits amounted to £1107 14s. 9d.

The accumulated surplus assets—that is, assets over and above all the liabilities—amounted to £15,970 16s. 8d., of which £10,800 was invested in debentures of local companies.

The progress of the Company is well illustrated by the following tabular comparison, for three years ending Dec. 31:—

	1877.	1878.	1879.
Net revenue	£16,367	£15,642	£16,603
Reserve-fund	7,103	9,105	10,821
Depreciation-fund	558	1,462	1,991
Insurance-fund	1,290	1,400	1,800
Permanent investment	146,806	148,475	150,812

[The half-yearly meeting of the Company was held on Monday last week; and a report of the proceedings will appear in next issue.]

NEWBURY TOWN COUNCIL GAS SUPPLY.

A Special Meeting of the Newbury Town Council was held on Friday, Feb. 20, in reference to the alterations and extensions proposed to be made at the gas-works—a subject which has agitated the Council at most of their recent meetings.

The Gas Committee reported that they met on Feb. 13, when Mr. Silverthorne's plans and report, Mr. O'Farrell's remarks thereon, and Mr. Silverthorne's observations and replies thereto, were considered. After some discussion, Mr. Lucas moved—"That no immediate steps be taken for removing the works from their present site." This proposal was seconded by Mr. J. C. Fidler, and supported by Mr. Ravenor. Alderman Adey thereupon moved—"That, taking into consideration the probability of the electric light being the light of the future, or that gas may be superseded by some other light, no steps be taken in reference to the removal of the present works, or to the carrying out of Mr. Silverthorne's scheme, but that a sum not exceeding £1000 be expended on the present works, to meet the requirements of the town for the next two or three years." This motion was seconded by Mr. Money, and Mr. Lucas having withdrawn his motion, was carried by 8 votes to 3, two members abstaining from voting. On the motion of Mr. Slocock, seconded by Mr. Knight, it was also resolved—"That Mr. O'Farrell be requested to consider and report to the Council at their next meeting as to the probable cost of giving effect to Alderman Adey's proposal.

Mr. O'Farrell's report was consequently presented to the Council at this meeting. He stated that he had had much difficulty in keeping within the prescribed limits of expenditure; but entered into details of the works which he considered came within that limitation. He, however, said that when done the works would only meet the wants of the gas consumers and the public for two or three years. No extra storeage for gas was provided for. Mr. O'Farrell concluded his report by stating that he had thus far complied with the terms of the resolution of the Committee, but having done so, he felt bound to inform the Council that the works would only be of a temporary nature, and that the outlay caused thereby would be partially lost, little of the material being available should the Council at the end of a year or two, under the pressure of circumstances and the additional requirements of the borough, be compelled to remove the works. The estimate amounted to £999 9s., but Mr. O'Farrell reported that a further expenditure of £733 would be, in his opinion, necessary in order to render the work efficient and economical.

Mr. Dolton moved the adoption of the report.

Mr. Money objected to Mr. O'Farrell's plan for the improvement of the works on the present site at such an outlay, which would only tide them over two or three years.

Mr. O'FARRELL, in reply to a question, stated that about £600 worth of the material estimated for in his report could be utilized on a new site.

Mr. C. LUCAS asked what was the present producing power of the works, and what increase would result by the improvements suggested in the Committee's report.

Mr. O'FARRELL said they could now only manufacture 87,000 feet of gas in 24 hours, and the improvements would allow them to make an increase of 46,000 feet; but as the public could at present take 25 per cent. more gas than the works could supply, the increase in two years would only be 25 per cent. more.

Mr. HOPSON seconded the adoption of the report.

Mr. B. SMITH said he thought Mr. O'Farrell thoroughly understood his work, and that his plans should be accepted. He proposed—"That land having been purchased, and plans prepared by the Engineer to the Board (Mr. O'Farrell), under the direction and approval of the Corporation, for erecting new works, the Council do now instruct Mr. O'Farrell to prepare full specifications, with detailed quantities, &c."

Mr. M. PALMER seconded this proposition.

Alderman ADEY objected to the removal of the works to the new site. The heavy expenditure for the sewerage would be upon them immediately, and he considered that as the Council were so divided upon the matter, and the public also, they should hold over such a heavy expenditure.

Several members having spoken in favour of the proposal to remove the works,

Alderman LUCAS moved as a further amendment—"That Mr. Silverthorne's plan be adopted, subject to any alteration or modification which may be suggested by the Gas Committee, and that he be requested to meet the Gas Committee for that purpose."

Mr. J. C. FIDLER seconded this amendment, which, on being put, was lost by 14 votes to 5.

The amendment proposed by Mr. Smith was next submitted, and carried by 14 votes to 8. The result, therefore, is, that enlarged works are to be erected on the new site near the Great Western Railway, at Greenham, as originally proposed by the Gas Committee.

THE PROPOSED ACQUISITION OF THE ABERSYCHAN AND PONTYPOOL GAS AND WATER WORKS BY THE LOCAL AUTHORITIES.

At the last meetings of the various Local Boards in the districts supplied by the Abersychan and Pontypool Gas and Water Companies, the proposed purchase of the gas and water works supplying the places was discussed at some length; the general conclusion being that, in the absence of specific information as to the cost to be incurred, no action could yet be taken in the matter.

The meeting of the Abersychan Local Board was held on Tuesday, the 17th ult., when Mr. Hambleton said that the deputation appointed to wait on the Gas Company had done so; but nothing was settled as to the terms of purchase. The Directors said they were willing to sell at a fair and reasonable price. The Chairman (Mr. R. Greenway) suggested that the matter be left in abeyance at present, until it was known whether the other Boards would join in the purchase. Mr. Williams, who was described by the Chairman as "one of the largest ratepayers," thought the scheme would never be carried through, and it was waste of time to further discuss it. He would strenuously oppose the purchase; and he knew three or four of the other large ratepayers who would also oppose. Eventually the following motion was carried unanimously:—

That in anticipation of the event of the various Local Boards agreeing to purchase the Abersychan Gas-Works and the Pontypool Gas and Water Works, on such fair and reasonable terms as have been contemplated, the Abersychan Local Board finds itself quite unable to consider the matter with a due regard to the interests of the ratepayers without further information. The Board therefore request that the two Companies be asked to furnish, for the private information of the various Boards, a copy of the annual statement and balance-sheets of the two Companies for the last seven years, and the Board also desires it to be stated what further capital (if any) is needed to complete the reservoir and the requisite arrangements for putting the two gas and water works in repair.

A meeting of the Panteg Local Board was held the same day, when the above resolution was submitted for approval, and agreed to *nem. con.*

On the following day the Pontypool Local Board met, and the Chairman (Mr. E. H. Davies) reported that the Committee appointed for the purpose had waited upon the Directors of the Abersychan Gas Company to ascertain if they would consent to dispose of their works. They said they did not wish to part with them, as they paid very well; but they expressed their readiness to sell the undertaking, at a reasonable rate, for the benefit of the district. They had invited Panteg, Llanvrechva, and Abersychan to join in the scheme, and Abersychan had expressed its readiness to do so, but there had not yet been received any reply from the other two Boards. Upon the resolution (as above) adopted by the Abersychan Local Board having been read by the Clerk, Mr. Lewis moved, and Mr. Wilton seconded, that the idea be abandoned; the former gentleman saying it would be a most complicated business, which the public did not require them to undertake. An amendment—"That the Committee continue their labours and report the result of their inquiries," was, however, carried by a majority of 2; though, during the discussion, much opposition was expressed to the purchase by a large section of the Board.

COMPLETION OF THE EXTENSIONS AT THE MACCLESFIELD CORPORATION GAS-WORKS.

The alterations at the Macclesfield Corporation Gas-Works, in the Commercial Road, having been completed, on Monday of last week an official inspection by the Mayor and Corporation took place, and much satisfaction was expressed at the improvements effected. Mr. T. Moore (the Engineer and Manager), under whose superintendence the work has been carried out, prepared a report as to what had been done, and it has been ordered to be placed on the minutes of the Gas Committee. It is as follows:—

To the Worshipful the Mayor (Chairman) and the Members of the Gas Committee of the Corporation of Macclesfield.

Gentlemen,—I beg to report that Messrs. Braddock and Matthews, of Stockport, Messrs. Westwood and Wrights, of London, and Messrs. Dempster and Sons, of Elland, have executed their respective contracts. The different buildings thus completed will provide for a very important extension to the manufacturing plant of your gas-works. The necessity for this has been felt for a long time, and the Committee, availing themselves of the experience of their predecessors, carefully considered the matter in detail, the result being placed before the Council in a series of resolutions in February last year. The figures and circumstances upon which those resolutions were based, show the Committee did not undertake the extensions one moment too soon, as, with an exceptionally bad state of trade, 11 out of your 12 beds of retorts have been at work from the beginning of December to the end of January this winter—a very dangerous and most expensive way of working indeed. You will now gradually get into a much better position. The old retort-house was capable of producing 500,000 cubic feet of gas per day. You have now room for fully 40 per cent. increased carbonizing power; to be added, of course, as occasion may require. You have hitherto had no proper storeage for tar and ammoniacal liquor, necessitating their immediate removal in the winter, and "together" (which depreciates their value), besides the labour of taking them up to the canal in carts. You have now four new storeage tanks, holding 60,000 gallons, equal to two months winter stock. You have also a convenient pump-room, and will soon have proper separating arrangements, and be able to pump the tar and liquor into covered trucks on the railway; thus, while adding to their value, save the nuisance and the expense of carting them through the streets to the canal. The room at the south end of the retort-house will, when it is completed, contain the engine, exhausters, governor, and the gauges; and the whole of this delicate machinery will be under the eye of the foreman in charge at a glance. This room, which is 54 feet long by 25 feet wide, has a flat roof, carried by strong wrought-iron girders. Upon this roof the condensers will be placed, and so clear the yard for the coke ground. Above the pump-room, and forming its roof, is placed the tank for the supply of the works with water. It contains upwards of 5800 gallons, and receives the rainfall from the large roof of the retort-house; thus utilizing water which before was wasted. Space for an additional stock of not less than 800 tons of coal and cannel has also been provided. Before, it had to lie out in the open yard, its value for gas-making purposes being thereby greatly reduced. The site and foundations for improved scrubbers have also been bought up and prepared, so that when it is deemed necessary to fix these, there will be no pulling down or turning back. The building known as the manager's house will provide the photometer and experiment room, an office, workshops, and what you have long required—convenient stores. You have done this work at a time when prices have been lower than they have been known for a number of years. The cost of the buildings, comprising the tar and liquor tanks, coal store, scrubber, foundations, pump, engine, exhausters, and governor-rooms, together with new retort-house, 97 feet long by 64 feet wide and 26 feet to wall plate, with wrought-iron slated roof and ventilating towers, will amount to £5000. The taking down of the foundation on such a restricted site through "made ground" and across "filled-up" tanks, and the erection of the new retort-house over the old one, the process of gas manufacture going on underneath all the time, have presented difficulties not ordinarily met with. No injury has, however, accrued to your plant, nor have your consumers suffered the slightest inconvenience. It is but just to remind you, you have had no architect's fees or clerk of the works to pay, the whole being the design of your own Engineer, who also prepared the plans and specifications, and has carried out the works in accordance with your instructions, and, I trust, to your satisfaction.

(Signed) THOS. MOORE, Engineer and Manager.

THE GAS SUPPLY OF STONE.

LOCAL GOVERNMENT BOARD INQUIRY.

On Tuesday, the 17th ult., an inquiry was opened in the Town Hall, Stone, by Captain HILDEYARD, one of the Local Government Board Inspectors, respecting an application made to the Board by the Stone Local Board, for a Provisional Order to empower them to construct gas-works within their district and the townships of Stone and Meaford, and to manufacture and supply gas within the district and the townships of Aston, Darlaston, Meaford, Oulton, and Walton.

Mr. H. C. SANDERS and Mr. J. UNDERHILL attended on behalf of the Stone Local Board; and Mr. A. YOUNG appeared for the Stone Gaslight and Coke Company, who opposed the application.

Mr. SANDERS, in opening the case for the applicants, gave a sketch of the origin of the Stone Gas Company, which, he said, was formed in 1853 under the Joint-Stock Companies Act. He also explained the constitution of the Local Board, their functions and powers, and their design with regard to the provision of new gas-works. The present Gas Company had no statutory powers, and he thought preference would be shown to an undertaking which should possess such powers as were sought by the Provisional Order now applied for. In 1854 the original Company obtained sanction to borrow £2000, with power to borrow an additional £1000. In 1855 the gas undertaking was transferred to the present Company, the purchase price being fixed at £2000. All that had been paid into the Company by way of capital was about £4000, and there were some 30 Shareholders. The present value of the concern was said to have been made out of profits. It was provided that after securing the payment of 10 per cent. dividends, further profits should be appropriated in the reduction of the price of gas charged to consumers. With respect to the proceedings of the Local Board, he quoted from the first section of the Public Health Act, 1875, to show that the Urban Sanitary Authority of any place might contract with the gas company for the supply of gas, or might themselves make such provision in case there was no existing company to give the supply, or from other considerations. He then stated that the Stone Local Board had considered the question of the gas supply to the town, and were favourable to becoming purchasers of the gas-works and managing the business themselves. Eventually, on Sept. 29 last, a resolution was carried by the Board that it was desirable negotiations should be opened with the Gas Company with a view to the acquisition of the gas-works by the Board. That resolution was forwarded the following day, with a request that the matter should be brought before the Company at the earliest opportunity. Several letters passed, and at length, on the 21st of October, a letter was received by the Board to the effect that the Directors of the Company were prepared to sell their works to the Local Board for £20,000. As might be expected, the Local Board did not feel disposed to become purchasers of the works at such a price as that; and, as the Company did not intimate that they would take less, the Board felt compelled to put themselves in a position for going to the Local Government Board and asking for a Provisional Order to enable them to provide gas-works of their own. However, ample time was allowed to intervene before definite action was taken. The Board intimated, in effect, that they did not want to take steps to obtain a Provisional Order, but were determined not to purchase the gas-works at the price asked. At length the notices were issued. In the drafted Order it was explained what the character of the proposed new gas-works would be—as to their capacity for well supplying the town with gas, and as to the storeage, &c., and the maximum charge was suggested to be fixed at 4s. per 1000 cubic feet. With respect to the present Company being a non-parliamentary one, and not having, therefore, any statutory obligation, the consumers had no security as to the prices which the Company might choose to charge for gas; they could charge 5s., 6s., 7s., or any other price. Neither was there any stipulation as to the quality of the gas. Adverting, then, to the opposition of the Gas Company to the application of the Local Board, he (Mr. Sanders) remarked that the Company had stated they had, since they purchased the gas undertaking, spent a considerable portion of the profits in improving the works, £9300 being the sum so expended. This, he thought, showed that the Company must have been making profit to the extent of from 20 to 30 per cent. The Company maintained that the quality of the gas was good, and that no complaints were made, but he should be able to show that complaints had been made from time to time. When the present Company bought the old works, the price charged for gas was 7s. 6d. per 1000 feet, and it was afterwards reduced to 5s.; but although

coal had become cheaper, the price of gas had been kept up, and of course the profits must have been greater than they were when coal was dear. The Company represented that the works were of an efficient character, that they stood upon extensive ground, were in first-class working order, and were well capable of supplying the whole of Stone with gas. As to their capacity for supply, he might say that he understood the Company really had no means of knowing how much gas they were making. The Company also alleged that prior to the formation of the Local Board at Stone, the road surveyors did not make any complaint as to damage done to the roads by the Gas Company. He should be able to show, however, that complaints were made of the condition in which the roads were left after they had been broken up. Under the Act applying to such cases, provision was made as to the way roads were to be opened for gas extension purposes. About the end of October last the Gas Company made an application to the Local Board for permission to open a road. To that, however, the Clerk to the Board replied, stating that they could not give such permission, as it was illegal; it being a fact that a local board could not give authority to a non-parliamentary gas company to open a road. An intimation was, however, privately made to the Company that if the road were opened no action would be taken. No other communication had been made since then, he understood; and, in fact, the Company were useless and powerless as to extending their mains to supply new consumers. The Company also stated that they had recently made improvements which would enable them to give the town a better supply of gas. With respect to the question of the price charged for gas, he quoted, by way of comparison, the prices paid in some neighbouring towns, stating that in most of the Potteries towns the price was 3s. 6d. per 1000 feet, while at Uttoxeter, a somewhat similar town to Stone, it was 4s. 2d., with discount allowance if paid in a given time, which brought the charge down to 3s. 9d. As to the price asked for the works, the Local Board complained that no variation from the high figure first named was made; not a word was said as to the price being fixed by an arbitration award. It was only natural, therefore, that the Local Board and the gas consumers should desire that the gas-works should be obtained upon a fair valuation, if obtained at all; or that they should be able to provide gas-works for themselves. He believed this movement received general favour in the town. He then read some certificates relating to the gas-works, and to their estimated value. In one case it was said that the town was well supplied with gas. The Engineer of the Longton Gas-Works (Mr. J. M. Darwin) estimated the value of the plant at £20,000. The Engineer of the Stafford Corporation Gas-Works (Mr. J. Storer) estimated the works, as a "commercial undertaking," as worth from £20,000 to £25,000. The mistake made in these cases, he (Mr. Sanders) said, was that the profits realized by the Company at present were made the basis of the estimation, which, he submitted, was fallacious. Alluding to the question of nuisances caused by the gas-works, both in the neighbourhood and in the river, he said that the Gas Company would not themselves apply for an Act of Parliament, because they knew that if they did there would be such stringent terms imposed upon them as would materially reduce their profits.

Dr. *E. Fernie*, the Chairman of the Stone Local Board, was then called, and, in answer to Mr. UNDERHILL, stated that the price of gas was 5s. per 1000 feet, subject to reduction if payment was made in a specified period. The house in which he lived was near the gas-works, and they experienced a great nuisance from the process of purification by the use of lime, instead of oxide of iron, which, he thought, would be better. He remembered being at a meeting of the Local Board, in October, 1878, when a memorial was presented, signed by a number of the inhabitants, calling the attention of the Board to the nuisance caused by the gas-works. It was represented therein that there was such an offensive smell from the works as at times to render houses in the locality uninhabitable, and the memorialists stated that they were informed that if the oxide of iron process were to be substituted for the lime process in the purification of the gas the nuisance would be obviated to a great extent. Witness then testified to the correctness of the correspondence which had been carried on between the official representatives of the Local Board and the Gas Company, on the question of the proposed purchase of the works. At a meeting of the Board on the 29th of September last, a resolution was carried to the effect that it was desirable negotiations should be opened with the Gas Company with a view to the acquisition of the works by the Local Board. This was transmitted the following day, with a request that the matter should be brought before the Directors. The progress of the ensuing correspondence was stated up to the time when the Directors of the Gas Company intimated that they were willing to dispose of the works to the Local Board for £20,000. The Board met and considered the offer, their conclusion being that the amount was exorbitant, and it was resolved to suspend all further negotiation with the Company until a Provisional Order could be applied for. Witness then stated that no other offer had been made by the Company, nor any overtures as to the transfer of the gas-works to the Board, and hence the proceedings which had resulted in the present application to the Local Government Board for a Provisional Order. He was most decidedly of opinion that it would be for the benefit of the town to have the supply of gas in their own hands.

In answer to Mr. YOUNG, witness said he did not think Stone could support two gas companies. There had not been any meeting of the inhabitants for the purpose of considering this question, the present proceedings being based entirely upon the resolutions of the Local Board. He did not know he had stated that the Board would be able to supply gas at 2s. 6d. per 1000 feet; but he had said that they could supply it at a much cheaper rate than the Gas Company. He was aware that in the Provisional Order the maximum price of gas was put down at 4s. per 1000 feet; but he was not responsible for that. He thought the Local Board, and the gas consumers too, would be able to make a profit out of the gas-works, though they had not formed any estimate as to what that profit might be. It was not till recently that the Board were aware that the Gas Company had no statutory powers. [Mr. Young produced a copy of a communication from the Local Board to the Gas Company, dated July 22, 1879, in which it was said that the Lighting Committee agreed to the Company's charge of 3s. 9d. per 1000 cubic feet for gas supplied to the public lamps, and considered the price satisfactory, comparing favourably with the price paid in other towns.] Witness said the first part was right, but he did not remember the final clause. He did not think gas could be made without creating a nuisance; but if oxide of iron were used in the process of purification, he thought the nuisance would not be so great. His house was about 80 yards from the gas-works, and his health had not been injured. His property had certainly increased in value since he went there 16 years ago, but not in the same ratio as property in other parts of the town. In the interest of the roads he should say it was preferable that the present Company should open the streets where necessary, rather than that a new gas company should do it. It was true that the first time the Local Board declined to allow the Company to open the streets was on the same date as when notice for the Provisional Order was given, but it was not because of giving such notice that the refusal was made. He had said that he thought the gas-works might be worth £13,500. The Board had not made any offer as to going to arbitration. They considered that if they had the gas-works, with the profits made, they would be able to reduce the price of gas to the consumers, and that there would also be a proportion to go to the Board for the reduction of the rates.

Mr. YOUNG: By that, the ratepayers who do not consume gas would derive benefit at the expense of the gas consumers?

Witness: It would depend upon the apportionment of profits.

Mr. YOUNG: Now, have you any serious intention of carrying out what you propose in reference to a gas-works undertaking, and is not all this done for the purpose of compelling the Gas Company to come to terms?

Witness: I have said I thought it was unreasonable that the Gas Company wanted so much for the works. I thought they would have parted with them upon just and fair terms; and we had the impression the Company would have offered some other terms than those first stated.

In reply to Mr. SANDERS, witness said that the members of the Stone Local Board, excepting those who were gas shareholders, were favourable to the present proposal. Before there could be any apportionment of the profits, the price of gas must be reduced to 3s. per 1000 feet; so that the consumers would be the first to reap profits. The Board could well undertake the duties connected with the management of gas-works.

Mr. *Thompson*, a member of the Local Board, and partner in the firm of Messrs. Joule and Sons, brewers, stated that he had occasion some time previously to complain of the price charged for gas supplied to their works, and the figure was subsequently lowered from 4s. 2d. to 3s. 9d. The price of gas to the public was 5s., with 10d. off for cash in a month.

Cross-examined by Mr. YOUNG, witness said he believed that if the Local Board obtained the management of the gas supply, the price would eventually be reduced to 2s. 6d. per 1000 feet.

Mr. *Arthur Hatfield*, shoe manufacturer, and a member of the Local Board, said at the present time three out of every four of the working-class consumers in Stone had to pay 5s. per 1000 feet for their gas. He considered it would be to the advantage of the town if the Local Board had the management of the gas supply, and that was the opinion of the class among which he moved.

Mr. *J. J. Chapman*, Surveyor and Sanitary Inspector to the Local Board, said there had been a great deal of breaking up of the roads by the Gas Company in various parts of the district, and he had from time to time complained to the Company of the manner in which this was done. He had no doubt it would be to the advantage of the town if the Local Board had the opening of the streets for their own purposes.

Mr. *Welch*, an accountant, of Liverpool, said he had examined the Company's accounts, and found that the Company had paid a dividend of 5 per cent. in the earlier years, subsequently increased to 7½, and afterwards to 10 per cent. The amount available for dividend in a period of 24 years, with the bonus shares, showed a total of £10,935, or an average dividend of about 19 per cent. per annum. Taking the last 14 years, the profits, he calculated, would be 25 per cent. per annum.

Mr. YOUNG cross-examined this witness at some length, with the view of showing that the amounts appropriated to the increase of capital were not so large as had been represented. The cross-examination was ultimately postponed, the Gas Company undertaking to supply a financial statement for the use of both sides in the inquiry.

Some other unimportant evidence having been given, the inquiry was adjourned.

FRIDAY, FEB. 20.

Mr. SANDERS said his clients had been very much taken by surprise at the cross-examination of Dr. Fernie, with reference to the letter of the 21st [of October from Mr. Gundry, the Secretary of the Gas Company, stating that the Company were prepared to recommend their Shareholders to sell their works as they stood for £20,000, and he might add that it would be useless to offer them a less sum. From that time until their meeting three days ago he regarded this letter as an ultimatum on the part of the Gas Company that they would not take less than £20,000, and under the circumstances the Local Board had no option whatever but to take the course they had in reference to a Provisional Order. The Local Board were quite willing to refer the matter to arbitration, if the Company consented to this, but such a course would not interfere with the present proceedings.

Mr. WYNNE, the Chairman of the Stone Gas Company, said the sum of £20,000 was mentioned to prevent any haggling. If at that time the Local Board had offered to arbitrate, the Directors would have accepted it; but in their present position they could not do so. He might say that personally his desire had long been that the town should have possession of the works when there was a properly-constituted body to conduct the undertaking in the interest of the town.

Mr. *J. Snape*, of the firm of Chapman and Snape, architects and surveyors, Newcastle, produced plans which he had prepared of the proposed new gas-works. He entered into a calculation with the view of showing that gas might be made at 3s. 6d. per 1000 feet, interest and sinking-fund being provided for, and leave a profit beyond. If the price were lowered, the consumption would, no doubt, be greater.

In cross-examination by Mr. YOUNG, witness said if the Provisional Order now applied for were granted, and it led to the closing of the Gas Company's works, Walton, Oulton, and Meaford would be shut out from a supply of gas, unless an illegal act were committed.

Mr. *Robert Paulson Spice*, C.E., said he had read the correspondence which had taken place with respect to the proposed acquisition of the Gas Company's undertaking, and had made himself acquainted with the history of the case. By the courtesy of the Chairman and the Directors he had also inspected the works. His opinion was that it was desirable to transfer the undertaking from the Gas Company to the Local Board. The arrangement of the works was unsystematical and unsatisfactory, and not in accordance with the modern practice. A large amount had been taken out of the pockets of the consumers, which, under a statutory company, would have gone towards the reduction of the price of gas. He agreed with Mr. Snape that 3s. 6d. per 1000 feet for the gas which was consumed would be sufficient to allow of a profit.

In cross-examination, witness said he assumed that if the Local Board established gas-works, one of the works would probably come to the ground; but he could not conceive that the existing Company would be such idiots as to resist all efforts at settlement. The fitter of the two in this case would be the present works, if the Company could sell gas cheaper than the Local Board. He did not know of any place of the same area and population where the gas was cheaper than at Stone, and he did not know any other place where £6000 had been added out of profit to £3000 of capital. But these averages of population and area all went for nothing.

This was the case on behalf of the Local Board.

Mr. YOUNG, in opening the case for the Gas Company, said the Local Board had been established for the purpose of carrying out a system of drainage which every one admitted to be necessary. A supply of water was also required. These were matters of paramount importance, which the Local Board ought to have endeavoured to carry out. But the Local Board seemed to have been animated by a feeling of jealousy against the Gas Company, acting under the belief that the Company received profits which ought to be used for the benefit of the public at large. It was clear that two gas companies could not co-exist in Stone, and that if works

were provided by two bodies, one of them must be a failure. He contended that no serious attempt had been made at bringing about an amicable settlement; and without imputing any deliberate injustice to the Local Board, he said that the Board had stolen a march upon the Gas Company, who intended applying to Parliament for statutory powers. It was the settled intention of the Gas Company to go to Parliament, and the ratepayers were not groaning under such a state of injustice as to render it unreasonable or unfair to allow them to remain as they were till the Company had done so, and placed themselves in such a position as to render them unassailable by the Local Board. The promoters of this Provisional Order had not taken any decided steps to ascertain the general feeling of the ratepayers; and, indeed, the resolution in favour of the Provisional Order by the Local Board appeared to have been passed in a crude manner, the promoters not having at the time any correct data to act upon. He then argued that even if the Local Board obtained their Order, the plans of Mr. Snape were impracticable for gas-works, and the site selected was unfit for the purpose. If the Local Board had not assumed the position of being at arm's length with the Gas Company, the probability was that they would not have been there holding the present inquiry. He commented upon the evidence of the witnesses called on behalf of the Local Board, and urged that it merely went to show the impolicy of erecting works in opposition to those already in existence. He also indicated the nature of the evidence he intended to call, observing that amongst other facts it would be shown that the testimony given by the Local Board as to the profits made on the gas-works had been much exaggerated.

Mr. *Martin Smith*, General Manager of the North Staffordshire Railway, said he had resided in Stone about four years, but was in no way connected with the Gas Company. He and the Railway Company were gas consumers and large ratepayers. He considered the price charged for gas fair, having paid higher prices in similar places for a worse article. Two gas companies could not exist in Stone. He was strongly against the Local Board having the gas-works, for the rateable value of Stone was only £12,000, and no sewerage works had yet been carried out. It would take a rate of 4s. in the pound to begin with, and there was a doubt whether the Local Board could carry on gas-works satisfactorily. There were 1300 ratepayers in Stone, and he did not think they ought to take upon themselves the responsibility of managing the gas-works for the consumers, who only numbered 380.

Mr. *F. Wynne* said he had been Chairman of the Gas Company for more than 20 years. The average cost of management, commencing at £15 and now being £100 a year, had been £48. To this economy he attributed the present state of the Company. He had seen a portion of the site of the proposed new gas-works flooded to a depth of 4 feet.

Cross-examined: In addition to the amount paid to the Manager (£100 a year), the wages account was £353 a year. With regard to the nuisance caused by the works, he said that if two gas engineers would say it would be better to use oxide of iron than lime for purifying, the Directors would adopt that system; but they were not going to accept the *ipse dixit* of Dr. Fernie as to which was the better plan of the two. He (witness) had always been an advocate for reducing the price of gas as soon as the Company were in a position to do so. There was not time, after receiving notice from the Board, for the Directors to apply for a Provisional Order or go to Parliament for a Bill.

Re-examined: If there had been time, the Directors would have gone to Parliament on receiving notice from the Local Board.

SATURDAY, FEB. 21.

Mr. *G. W. Stevenson*, C.E., said he had had nearly 30 years experience in town improvements, and had been for a considerable length of time engineering adviser to the Metropolitan Board of Works. He had watched carefully the course of legislation with respect to gas undertakings during the last 20 years. He had visited the existing gas-works at Stone, and had formed the opinion that they were large enough to supply the consumers. He admitted that there were a few defects in connection with the works, but they would not interfere with the supply of good gas in abundant quantity. He held the opinion that whatever shortcomings there were in the present works could readily be redressed and rectified at a small outlay. Good 18-candle gas was being supplied, and the price was so low that he did not know of any town, where the population was the same, in which the price of the gas was equally low, and he knew the prices all over the kingdom. He advocated the Company, for their own sakes, placing themselves under parliamentary control, as at present their capital and property were insecure.

Mr. YOUNG: Are you aware what the price charged for gas is at Newport, a small town near here? Are you not aware that it is cheaper than it is here?

Witness: I am certainly not aware of the price charged in that town, but coal may be cheaper and more easy of access there than here.

Mr. *Alfred Penny*, C.E., gave evidence in effect similar to that of the last witness. He stated that for a very small outlay the present Gas Company's works could be made, in efficiency and convenience, second to none in Staffordshire.

Mr. *J. Slocombe*, a member of the firm of Messrs. Howard, Smith, and Slocombe, accountants, of Birmingham, said he had had great experience in dealing with gas companies accounts. He had made a statement of the capital account of the Stone Gas Company, which consisted of a paid-up capital of £2000, and he had ascertained what the Company had from time to time appropriated for extensions, from the years 1856 to 1879. He had also made out a tabulated statement and schedule showing the progressive capital, expenditure, and dividends payable thereon, calculated at 10 per cent. on the outlay and bonus shares distributed to Shareholders from 1856 to 1879. Without going through the account in detail, the statement, he said, showed in result the amount, including bonus shares of £6000, the dividends and bonus shares actually distributed being considerably less than the total progressive outlay.

Mr. SANDERS: Then the result of this is, that even crediting 10 per cent. on original outlay, and 10 per cent. on expenditure for the year immediately it is incurred, the amount divided and bonus shares come to within £800 of the calculated amount of dividends?

Witness: Yes; that is so, and the works now stand at something like £10,000 in the books.

So that, according to your statement, there is only £3000 which can be credited to capital?—At 10 per cent. it would be so; but as a matter of fact the Company are only paying 5 per cent. Since 1878 they have only taken 5 per cent. on £8000.

Mr. YOUNG said he hoped he had already been able to impress the Company's legitimate arguments sufficiently upon the Inspector, and, therefore, he would not trouble him with any further observations.

It having been previously intimated by the Inspector that he should be glad to listen to any observations from any of the principal ratepayers of the town,

Mr. M. SMITH, General Manager of the North Staffordshire Railway, remarked that a good deal of what he should have addressed to the Inspector had been rendered unnecessary by the course pursued by Mr. Young. The last two witnesses had given it as their opinion that the granting of a Provisional Order would be injurious to the town of Stone, and he had particularly noticed that Mr. Sanders did not venture to cross-examine them on that point. He (Mr. Smith) should not have come before the Inspector as a ratepayer, if the ratepayers had been properly appealed to for their opinion in regard to this matter. In reference to the subject of a gas undertaking, no meeting had been called. When the Local Board was formed there was considerable discussion in the town on the subject of drainage, but not one word was said on the subject of gas. He could bring forward evidence to prove that drainage was now as necessary as ever; but although it was so sadly wanted, the Local Board were rushing headlong at the gas question. Let the Local Board turn their attention to supply better and more efficient drainage, among the things which were more necessary than gas. He did not believe in the Local Board undertaking this business, and, if they did undertake it, he believed that in the end they would burn their fingers. There was only one precedent—that of the town of Maryport—of two gas companies being supported; but the rates of that town were completely saddled by the burden of two works, which had cost the town £30,000. In this case the two works ran neck and neck for a time, but, as a natural result, one had to succumb, as the town could not possibly support two, which was, he believed, the identical position of the town of Stone. In conclusion, he reminded the Inspector that he represented the unfortunate class who had to pay, and he entreated him to remember that there was a third party to this argument, which was the despised and most unfortunate ratepayers.

Mr. SANDERS then addressed the Inspector in support of the application of the Local Board. Adverting to the speech to which they had just listened, he said the Board had been charged with neglecting the drainage of the town, but he could say that the sewerage scheme was now under the consideration of the Board, who had already expended some money in commencing operations. He then reviewed the evidence on both sides, and asked the Inspector if the Local Board could have pursued any other course; and also whether the course taken by the Gas Company might not have been very different, and whether the Board's action had not been forced upon them by the Gas Company, who were their only opponents in the case. The nuisance caused by the gas-works had been proved. Local boards and corporations were undoubtedly the right people to have control of a town's gas, and there were several cases where the system worked well. He endeavoured to show that it would be to the benefit of the ratepayers and the town for the Stone Local Board to have the control of the gas undertaking, though he agreed that the town could not support two gas-works. He submitted, in conclusion, that the Gas Company were fully able, considering the enormous profits they made, to supply gas at a much cheaper rate.

The INSPECTOR said: I think a Provisional Order for the setting up of gas-works would not be for the good of Stone. Supposing the Order were granted by the Local Government Board, it would then have to go to Parliament, where you might not have their decision your way. My own view of the matter is that you would have never-ending litigation and expense, because your case is an unusual one. It is stated for the Board that their object is not to press the Company to part with their works, and that if the Provisional Order be now obtained by the Board the works will be constructed. Both sides have agreed that the town cannot support two gas-works, and, consequently, there would be a great hardship entailed on somebody, and I should imagine that very probably the ratepayers would suffer as well as other people; so that I cannot think it would be for the good of the town. We have now a distinct undertaking from Mr. Wynne that the Gas Company will apply for parliamentary powers, though it was the offer of the Local Board two months ago; and had the Company agreed to do then what they have offered to do now, I have no doubt both sides would have been saved a great deal of trouble and expense. I wish the Company were in a more official form; but I hope Mr. Wynne's undertaking will receive the approval of, and be borne out by the body of the Shareholders.

Mr. WYNNE: There is no doubt at all, Sir, that the Shareholders will carry out what the Directors recommend.

The INSPECTOR: A few months ago that offer would have satisfied the Local Board. I think now that it is only putting it off another year, and their hardships—and they are very small—will only last during the year. That the price of the gas might be lowered I have no doubt, if the undertaking were in the hands of the Local Board, as they could get money on cheaper terms. As to the question of acquiring the works from the Company, this is a matter—supposing the Company are willing to part with them—between the ratepayers and the Local Board. I understand there has been already considerable pressure put on the Local Board to carry out works of sewerage. Now, it is customary with the Local Government Board, when there is pressure on matters of this kind, to refuse a loan for carrying out other works. The Board have full power of enforcing the proper arrangement of sanitary matters, and when they have a case of this sort before them, they say, "You must give us an assurance that these works are in a way to be carried out." I think, on the whole, both sides have acted in a premature way. The Gas Company first sent a conclusive answer in strong terms to the Local Board; then the Board retaliated by acts. They go and ask for a Provisional Order, but if they had waited a little longer they might perhaps have saved themselves a great deal of expense. I hope, however, they will come to terms with the Gas Company.

The inquiry then terminated.

SPENCE'S METALLIC COMPOUND AND ITS USE FOR PIPE JOINTS.

In reference to the paper read before the Society of Arts on the 11th ult., on "A New Metallic Compound, and its Application to Industrial and Artistic Purposes," and the discussion thereon [see *ante*, p. 250.], Mr. Robert Morton, of the London Gaslight Company, writes to the Society to say that while the compound is very easily manipulated, it is also excessively brittle—a fact altogether ignored or overlooked in the paper and discussion. With regard to its use in jointing socket-pipes, Mr. Morton says that, having had his expectations raised in this direction, he is reluctantly compelled, in the interests of his professional brethren and any one contemplating its use, to state that, contrary to Mr. Livesey's experience, he has, as yet, been unable to get a sound joint by its use. At his works they have tried a considerable number on 4-inch pipes, about half of which were made under the immediate supervision of Mr. Spence's representative, and not one of them has stood the test, the major portion leaking under a pressure of from 3 inches to 5 inches of water.

Mr. W. Faija, of Westminster, also writes on the same subject. In the course of his letter he says: "That there are many uses to which the metal can be put, there is no doubt; and it seems to have given satisfaction both to Mr. Livesey and to Dr. Cole, in the work for which they have each used it; but I think they are in error in saying that it expands in setting. It has a very limited range of temperature at which it is in a liquid state; and, consequently, when poured into a mould, cools or chills quickly on

the outside, and thus draws the still molten metal in the centre towards the sides. The result is, that it is most difficult to obtain a sound casting of any thickness. The outside will be smooth and perfect, and will fill the mould well, and may thus lead to the supposition of its expansion. If the metal is thin, the casting will no doubt be generally sound, but if any thickness of metal is required, some special means of casting will have to be adopted, or there will, undoubtedly, be a cavity in the centre. Mr. Livesey seems to have got over the difficulty of its getting alight, which it does very easily while it is being melted; and if he has broken any of the pipe-joints he has made, it would be interesting to know the result of his examination. I should not be disposed, with my present knowledge of the material, to endorse the opinion as to its elasticity. It has not the ductility of lead, and hence gives different results; but I should consider that the continuity of the pipes experimented with was maintained more by its hardness and unyielding properties than by its elasticity. I may say the experiments I made were to determine the tensile strength of the metal, which proved to be about 600 lbs. per square inch of section."

RECENT SALES OF GAS AND WATER STOCK.

British Gaslight Company.—On Tuesday, the 17th ult., two sales by auction of a number of shares in this Company took place in Norwich, when an average of £35 per share was realized.

Croydon Commercial Gas Company.—On Wednesday last, Messrs. Blake, Son, and Haddock offered for sale 370 fully-paid £5 shares in the above Company. They consisted of 70 original, or first capital shares, the last dividend paid on which was at the rate of 11½ per cent. per annum; 121 second capital shares, bearing a similar dividend; 122 third capital shares, bearing a dividend of 8½ per cent.; 14 A shares, bearing 11½ per cent. dividend; and 43 B shares, on which the last dividend paid was at the rate of 8½ per cent. per annum. The prices realized were as follows:—Original shares: 20 at £11 10s., £230; 50 at £11 5s., £562 10s.—total, £792 10s. Second capital shares: 71 at £11 10s., £816 10s.; 50 at £11 5s., £562 10s.—total, £1379. Third capital shares: 60 at £8 10s., £510; 62 at £8 7s. 6d., £519 5s.—total, £1029 5s. A shares: 14 at £11 10s., £161. B shares: 5 at £8 7s. 6d., £41 17s. 6d.; 38 at £8 5s., £313 10s.—total, £355 7s. 6d. The gross amount realized by the sale was £3717 2s. 6d., being a premium of £1857 2s. 6d. on the nominal value of the shares.

Maidstone Gas Company.—On Thursday last, Messrs. Tootell and Sons sold by auction four £25 A shares in this Company for £200, and one £25 new share for £41.

Sheffield United Gas Company.—On Tuesday, the 24th ult., a number of shares in the above Company were sold by Mr. R. Lowe. £150 (£100 paid) class A stock was disposed of at £199 per cent; £175 16s. (£100 paid) class B stock being sold at the same rate; £90 class C stock sold at £198 per cent.; and 12 new £10 shares (£4 paid) each realized a premium of £6 7s. 6d. Ten class E £8 10s. shares were knocked down at a premium of £3 12s. 6d. each.

Southampton Gas Company.—On Friday, the 20th ult., 20 £25 shares in this Company were sold at a premium of £7 each.

Sale of Gas and Water Stock by the Stock and Share Auction Company, Limited.—On Thursday last the above-named Company, which has just been started for facilitating the disposal of stock in gas, water, and miscellaneous companies, offered for sale by auction, at their Offices, Crown Buildings, Old Broad Street, E.C., a large number of shares in established undertakings, amongst them being the following gas and water stock:—100 £10 shares (£7 10s. paid, the balance of £2 10s. to be paid by the purchaser in April) in the North Middlesex Gas Company, and entitled to a dividend of 10 per cent.; £2000 worth of 6 per cent. debentures in the Beyrout Water-Works Company; a £300 first mortgage debenture in the Cadiz Water-Works; and 10 £100 6 per cent. second mortgage bonds in the People's Gaslight and Coke Company of Chicago. The North Middlesex gas shares realized a total of £1055, or an average of £10 11s. each; the Beyrout Water-Works Company's debentures sold at the rate of 65 per cent., the total being £1300; for the £300 debenture in the Cadiz Water-Works 100 guineas were bid, but the offer was declined; and the bonds in the Chicago Company were taken by one buyer at the rate of 75 per cent. Mr. E. H. Bousfield (of Messrs. Edwin Fox and Bousfield, the Auctioneers to the Stock and Share Auction Company) conducted the sale, which was largely attended.

ALARMING FIRE AT THE DUNFERMLINE GAS-WORKS.

About half-past seven o'clock on Friday morning a fire broke out in the Dunfermline Gas-Works, which at one time threatened to be of a very dangerous character. It occurred in the meter and governor house at the south-east angle of the works, and had been preceded by an explosion, owing, it was conjectured, to some gas having escaped from one of the governors, and ignited at a safety lantern placed at the top of the door. When the fire was first discovered, the flames were issuing from the roof, and a messenger was at once despatched to summon the fire brigade. Meanwhile a considerable number of willing workers tried to subdue the fire by throwing water upon it, there being an abundance at hand. The fire, however, had obtained such a firm hold of the woodwork of the roof of the building that, previous to the arrival of the fire brigade, it was feared it might spread to the purifying and retort houses. Fortunately, the gas in the holder nearest the burning building was nearly exhausted, though the others were full. Soon afterwards the fire brigade arrived on the scene, and, aided by the exertions of some of Messrs. Matthewson and Sons workers, who had turned out with their factory hose-pipe, eventually extinguished the flames, and allayed the fear that had been entertained for the safety of the adjoining premises and the gasholders. It was then seen that the explosion must have occurred in the governor regulating the supply of gas to the portion of the town lying south of the gas-works. The governor was quite out of gear, and the top was completely off. The other governor, which regulates the supply to the northern part of the town, was also much damaged; and the station-meter, which stood between the two governors, likewise suffered very considerably. The whole of the external fittings of the meter were demolished, while the front plate was fractured from top to bottom, owing to the combined influence of the intense heat and the water discharged into the meter-house to extinguish the fire. This meter, which had been placed in position at a cost of £300, was comparatively new, and was capable of registering 20,000 cubic feet of gas per hour.

Immediately after the explosion, Mr. W. Mackenzie, the Manager, took steps to ensure that the supply of gas to the public should not be interfered with, matters being so arranged as to send out the ordinary supply through the bye-pass pipes provided for such an emergency. Before nightfall matters had been so far arranged that no inconvenience was experienced from the mishap. The supply of gas to the town was continued at night, but the lighting was somewhat defective, owing to the want of a regulated pressure. It is estimated that the damage and loss of gas will amount to about £500.

THE LANCASHIRE COAL AND IRON TRADES

(FROM OUR OWN CORRESPONDENT.)

There is no improvement in the trade of this district so far as the demand for round classes of coal is concerned. Less time is being worked at the pits generally, and the tendency of prices continues downwards. The winter demand for house-fire coal is now practically over, and, as I anticipated in a previous report, at many of the collieries the bulk of the stocks is left on hand. Good furnace coal moves off moderately well, but the supplies of common round coal are much in excess of the requirements. For gas-making coals I do not yet hear of many inquiries, and I have nothing material to add to what I stated a few weeks back. The indications are all in the direction of low prices ruling during the ensuing season. Engine classes of fuel continue generally firm in price. The chief demand is upon slack, which largely takes the place of better classes of fuel, which a year or two back were more generally in use for mill purposes, and sellers are hardening in their prices. The average prices at the pit mouth are about as under:—Good Wigan Arley, 8s. to 8s. 6d.; common, 6s. to 6s. 6d.; Pemberton four-feet, 6s. 3d. to 6s. 9d.; common round coal, 5s. to 5s. 9d.; good burgy, 3s. to 3s. 6d.; and common, about 2s. 6d. per ton.

The shipping trade continues in a depressed condition. There are large quantities of coal at Liverpool, and orders are difficult to secure, notwithstanding the low prices which sellers are now willing to take.

For coke an active inquiry is reported, and makers are able to maintain without difficulty prices which are fully 2s. 6d. per ton above the lowest figures lately ruling in the market. The demand is chiefly for the better classes of cokes, and for these at the ovens prices range from 15s. to 17s. per ton, small cokes being quoted at from 11s. to 12s. per ton.

It is becoming evident that a large quantity of iron has been bought and held upon speculation, and as many of the holders are endeavouring to realize, a weaker tone has been imparted to the market. Second-hand lots of pig and manufactured iron, and even hematites, are now to be bought in some cases at considerably under late rates; but, so far as consumers in Lancashire are concerned, there is not much disposition to buy at present; requirements, as a rule, being already well covered. The weakness in the market has not yet had much effect upon makers, who are generally well sold, and not anxious for further orders just at present. Lancashire producers have even advanced their quotations, Lancashire pig iron delivered into the Manchester district being quoted at about 72s. 6d. per ton, less 2½. Manufactured iron is rather easier for prompt sales, and ordinary bars delivered into the Manchester district have been offered at from £8 5s. to £8 15s. per ton.

Founders are a little better off; but they are unable to secure orders at prices based on the present cost of the raw material.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The shipments of gas coals from the Tyne improved last week. More would have been exported coastwise and abroad had not a strong north-westerly gale blown three days. This prevented the ordinary gas-house steamers and sailing vessels from keeping their time, and it threw out somewhat the shipping business at the Tyne Dock. The demand for coals of most kinds, households excepted, is good; but the speculation with regard to a large increase in values is not realizable; 7s. per ton, less 2½, for best gas, and 10s. per ton best steam, are the ruling rates. They form a basis for most kinds of contracts. Last week 20,000 tons of steam were sold at this figure. There is no appearance that they will alter very materially—this side of September, at any rate.

The coasting shipping trade is as dull as ever. Scarcely a dozen sailing vessels were chartered last week to load coals for British ports. The gas coal trade continues to be done by regular steamers and by sailing vessels, which run all the year round.

The shipment of gas and steam coals to the Baltic has commenced. Pretty large contracts to supply Russia with gas coals have been made; but, as a rule, merchants who are in the habit of shipping gas coals to that country, are hanging off until the tendency of trade is fully indicated. That it will be large is pretty certain. The coke business continues to be very firm. Prices have steadily advanced, notwithstanding the recent considerable increase of production.

The chemical market showed an improvement of 2 per cent. upon previous rates. Lead was cheaper, and copper fully maintained its price. The timber trade is not quite so firm as it was. The foundry trade of the Tyne is very busy, except in the manufacture of water and gas pipes, in which department they are rather slack.

Gas and water companies shares maintain their full value here. The dividends of all the large companies in the North of England show very satisfactory results. Next half year there is likely to be a considerable increase in the consumption of water, through the chemical and iron works having got into very full work.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

A general meeting of the Gaslight Company, Limited, which was recently formed at Buckhaven, Fifeshire, was held on Saturday, the 21st ult., when it was arranged that the Directors should apply for a suitable site for the works, and obtain the necessary plans. It is therefore expected that ere long building operations will be commenced.

I understand that the experiments connected with the lighting of St. Enoch Station, Glasgow, last autumn, with the electric light, and the negotiations to which they gave rise, have now eventuated in something definite. Arrangements have been made with the British Electric Light Company to have the station regularly and systematically lighted up by the use of six lamps, over a period of twelve months, at a charge of so much per hour, the Railway Company providing the engine power to drive the dynamo-electric machines, and the Electric Light Company providing all the other apparatus, together with the experts to work the light. It is reported that Sir William Thomson was commissioned by the Directors of the Glasgow and South-Western Railway Company to devise a new form of reflector to suit the circumstances of the station, which is almost an exact repetition of the Midland Station at St. Pancras, but on a somewhat smaller scale. There is some talk of having the lights in operation within the next two or three weeks. So far as I am aware, the Glasgow station will be the first in the kingdom to which the electric light has been adapted.

While speaking of the electric light, I may mention that it is intended to use it on board a splendid Cape mail steamer of 3600 tons, which has just been launched on the Clyde, for the Union Steamship Company of Southampton. The saloon in which the light will be used is about 42 feet square, the height in the centre being about 18 feet.

A temporary gas-lamp has been put up in the middle of Bernard Street, Leith, the principal thoroughfare of the town, by the Lighting Committee of the Leith Town Council, for the purpose of testing the utility of Sugg's shadowless lantern. The lamp was used for the first time on Friday night, and gave an excellent light. The burner that is being used is a Sugg's "London" Argand, the consumption of which is 35 cubic feet per hour, giving a light equal to 220 standard candles, at a cost of 2d. per hour.

A general meeting of the Coatbridge Gas Company was held last Thursday—Mr. J. Alexander in the chair. The Secretary read the report, which stated that the Directors, in submitting a statement of accounts for the eight months ending Dec. 31, 1879, had pleasure in informing the Shareholders that the affairs of the Company were in a most satisfactory condition. The consumption of gas had slightly decreased, but the Directors considered it gratifying that the profits of the undertaking had increased considerably as compared with the corresponding period of last year, the amount clear being £2026 4s. 6d. The Directors recommended the payment of the usual dividends of 10 and 7 per cent. on the old and new stocks respectively, which, with the 4 per cent. interest on the money paid in advance of calls on new stock, would absorb £1907 7s. 5d., leaving a balance of £118 17s. 1d. to be carried to next year's account. Operations had now been entirely suspended at the old works, and the Directors had pleasure in stating that their most sanguine expectations as to the new works had been fully realized. On the motion of Mr. W. Baillie, the report was unanimously adopted. Mr. W. White, in moving a vote of thanks to the Directors, referred to the satisfactory condition of the Company. From a gas manufacturing point of view, they had works which reflected the highest credit on all concerned, and were capable of supplying a very large district. The Chairman, in responding, said Mr. White had remarked that the works were capable of supplying a very large district. They were in every way well equipped for the supply of a very greatly increased population, and as they had powers in the Company's special Act to supply four parishes, annexation was one course open for a greatly increased consumption. He thanked the meeting on his own behalf and that of his co-Directors for the way in which their services had been acknowledged.

On Thursday, the 19th ult., Mr. R. S. Carlow, Gas Manager, Port Glasgow, and late Secretary of the West of Scotland Association of Gas Managers, was entertained at dinner in the town in a semi-public manner, and presented with his portrait by way of acknowledging his excellent services to the Association. Mr. Samuel Stewart, Greenock, occupied the chair, and there were also present Messrs. Johnstone, Jeffray, Renfrew, Dalziel, Mitchell, and M'Gilchrist, together with Bailie Hunter, Convener of the Port Glasgow Gas Committee, and a number of other local gentlemen. The presentation was made by Mr. Mitchell, Coatbridge, President of the Association; and Mr. Carlow made an appropriate reply.

A deputation from Musselburgh met the Works Committee of the Edinburgh and District Water Trust last Tuesday regarding the water supply of the burgh, when an amicable arrangement was come to. The price which is understood the Musselburgh people are to pay for the water will be an annual charge of 6 per cent. on the cost of the pipe, and 3d. per 1000 gallons. A remit was made to Sir James Falshaw, Chairman of the Works Committee; Provost Henderson, of Leith; Provost Keir, of Musselburgh; and the Engineer, to accept contracts for the work of laying the pipe, which will be begun almost immediately. It is expected that these operations will be completed in the course of a couple of months, and the Moorfoot water introduced into Musselburgh by the 1st of May.

The death has recently been announced of Mr. Ramsay, formerly Manager of the Edinburgh Water Company. Dying at the ripe age of 85, Mr. Ramsay outlived by 10 years the Company to which he was so long a servant, that time having elapsed since the water supply became a public trust. In the 25 years of his administration the supply seemed to be always lagging behind the demand, not because Mr. Ramsay was neglectful in promoting extensions, but because the growth of the city and the great demand for water per head were too much, even for the most energetic efforts. In Mr. Ramsay's death a very prominent figure has been removed from Edinburgh society.

A very large amount of business was done in the Glasgow pig iron market last week, at receding prices. On Monday 68s. cash was paid, and down to 65s. 1d. was accepted on Friday afternoon. The American buying is off for the present, and without that the current prices can hardly be maintained.

The coal market is very dull. Shipping trade orders are scarce, and there is keen competition for the few orders that are going. House descriptions are exceptionally quiet, at easier prices.

Wells (Somerset) Water Company.—The annual meeting of this Company was held last Thursday—Mr. George Thorn in the chair. The report having referred to the appointment last year of Mr. Edward Padfield as Engineer and Manager, stated that in consequence of some of their revenue being still locked up in the estate of the late West of England Bank, the Directors were only able to recommend a dividend of 5 per cent., but next year they hope to do more.

Ripley Gas Company.—The annual general meeting of this Company was held on Monday last week—Mr. G. Staley presiding. The retiring Directors—Mr. W. Jessop and Mr. J. Woolley—were re-elected, and Mr. G. Day was re-elected Auditor. The Chairman stated that the receipts of the Company for the past year had increased, although trade was depressed, and the Directors had been enabled to announce a reduction in the price of gas. A dividend of 9s. 6d. per share was recommended, and it was decided that the Directors fees should be raised from £35 to £50 per annum.

The Water Supply of Clay Cross.—Some months ago, at a public meeting of ratepayers in Clay Cross, a deputation was chosen to wait on the Local Board for the purpose of asking that body to purchase the water-works from the present owners, the ratepayers alleging that the rates charged for the water supplied to them are too high. The Board asked the Company if they were willing to sell their undertaking, and the question came before the Directors at a meeting last week, when they informed the Clerk to the Local Board that they are quite willing to sell the works, and if the Local Board will make them an offer it shall be considered. They further informed the Board that the price of water supplied to cottage houses will be reduced from 16s. to 14s. per year, such reduction to take place from the 1st of January last. The scale of charges to shops is 25s. per year; for beerhouses, 30s.; and for full licensed houses, 50s. per year. The letter will be discussed at the next meeting of the Local Board.

Ruthin Water Company.—The half-yearly general meeting of this Company was held on the 14th ult.—Mr. J. Jones in the chair. The Directors report stated that the total receipts on revenue account amounted to £318 1s. 1d., and the expenditure to £136 8s. 4d., leaving a balance of £181 12s. 9d., which was carried to the credit of the net revenue account. After payment of the dividend declared in August last, and interest on loans, there was a disposable balance of £159 14s. 2d., out of which the Directors recommended the payment of a dividend for the half year at the rate of 5 per cent. on preference shares and 2½ per cent. on ordinary shares, which would absorb £155, leaving £4 14s. 2d. to be carried forward to next account. The Directors reported a steady increase in the number of consumers, but a considerable falling off in the sale of water by meter. They trusted, however, that the ensuing season would prove more favourable than the past. The report was unanimously adopted. Of the two Directors retiring (Messrs. W. Low and R. T. Bell), the latter was re-elected, and Mr. J. J. Bancroft was chosen to replace Mr. Low, who did not offer himself for re-election. Dr. W. D. Jones was re-appointed Auditor. It was resolved that the future meetings of the Company should be held annually in the month of February, instead of half yearly, as heretofore.

Grantham Gas Company.—The eleventh half-yearly meeting of this Company was held on Thursday, Feb. 12, when the Directors report was as follows:—

Your Directors have again great pleasure in reporting favourably of the financia state of your Company, which will show a sufficient justification for the movement made at their meeting in August last for a fourth reduction of 5d. per 1000 feet in the price of gas, thereby reducing the cost to 3s. 4d. per 1000 feet, which they think must be considered very reasonable; and, notwithstanding the present depressed state of trade, they are happy to announce that their revenue has not been much affected.

The Company's works are in their usually efficient state, and only require ordinary outlay.

Your Directors have been enabled to add £300 to the reserve-fund, thus bringing it up to the full amount allowed.

Your Directors recommend the payment to the Proprietors of an interim dividend for the past half year at the rate of 10 per cent. per annum on the original capital, and of 7 per cent. per annum on the new shares.

The Company's capital consists of 1250 original £20 shares, and 250 new shares of a like value. The amount expended on works (including £741 last half year) is within £382 of the sum raised. The receipts for the six months were £4579 14s. 5d.; and the balance applicable to dividend amounted to £2414 10s. 4d., after placing £500 to the reserve-fund, as stated in the report.

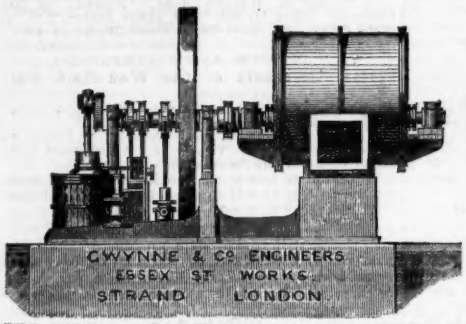
Share List of Gas and Water Companies.

(Corrected by Mr. Arthur G. Prater, 23, *Cornhill, from the latest Stock Exchange Quotations.)*

Number of Shares issued.	Amount per Share.	Name.	Amount paid up per Share.	Last Divd. p.Cent. p. Ann.	Latest Quotations.
	£	Gas Companies.	£ s. d	£ s. d	£
589992	10	Alliance and Dublin	10 0 0	10 0 0	15½–16
10000	20	Anglo-Romano . .	20 0 0	10 0 0	21–23
5000	20	Bahia (Limited). .	20 0 0	4 0 0	14–15
1500	20	Do., 2nd pref. . .	20 0 0	7 10 0	20–22
40000	5	Bombay (Limited).	5 0 0	7 10 0	5¾–6
10000	5	Do., fourth issue.	4 0 0	7 0 0	¼–¾ pm.
10000	10	Bournemouth . . .	10 0 0	8 0 0	13½–14½
219700	..	Brentford	100 0 0	9 0 0	148–53
..	..	Do., 5 per ct. pref.	100 0 0	5 0 0	95–100
..	20	Do., C shares . .	18 0 0	9 0 0	6–8 pm.
5460	20	Brighton	20 0 0	10 0 0	33–35
5000	20	Brighton and Hove	20 0 0	10 0 0	33–35
14000	20	British (Limited) .	20 0 0	10 0 0	34–35
7223	20	Cagliari (Limited).	20 0 0	6 10 0	17–18
1500	10	Colney Hatch . . .	10 0 0	5 0 0	9–11
8500 Of.	Sk.	Commercial	100 0 0	11 0 0	180–185
70000/.	Sk.	Do., 7 per cent. .	100 0 0	8 0 0	135–40
20000	20	Continental Union.	20 0 0	6 10 0	19–20
2000	20	Do., new	14 0 0	6 10 0	1½–⅝ dis
10000	20	Do., preference .	20 0 0	7 0 0	23½–24½
75000/.	Sk.	Crystal Palace District	100 0 0	10 0 0	175–180
125000/.	Sk.	Do., 7 per cent. .	100 0 0	7 0 0	125–30
80000/.	Sk.	Do., preference .	100 0 0	6 0 0	120–5
25000	6	Do., ordinary 7 per cent. . . .	1 4 0	7 0 0	¾–1 pm.
7100	25	Edinburgh	25 0 0	10 0 0	46–48
23406	10	European (Limited)	10 0 0	10 0 0	17½–18½
12000	10	Do., new shares.	7 10 0	10 0 0	4½–5½
35406	10	Do., new shares .	5 0 0	10 0 0	2½–3½
4095300/.	Sk.	Gaslight & Coke A.	100 0 0	10 0 0	178–80
1000000/.	Sk.	Do. B.	100 0 0	4 0 0	73–75
50000	10	Do. do., 5th do. .	10 0 0	5 0 0	16–17
2000000/.	Sk.	Do. C 10 p.c. pref.	100 0 0	10 0 0	202–207
3000000/.	,,	Do. D do. do. .	100 0 0	10 0 0	202–207
1650000/.	,,	Do. E do. do. .	100 0 0	10 0 0	202–207
300000/.	,,	Do. F 5 do. do. .	100 0 0	5 0 0	101–4
600000/.	,,	Do. G 7½ do. do. .	100 0 0	7 10 0	150–156
1200000/.	,,	Do. H	100 0 0	7 0 0	127–30
		Gas Companies.	£ s. d	£ s. d	£
6200	5	Georgetown, Guiana	5 0 0	7 0 0	4½–4¾
300000	100	Glasgow Corporation Gas	100 0 0	9 0 0	205–210
115000	100	Do., do.	100 0 0	6 15 0	155–160
..	100	Grimsby Gas, A. .	100 0 0	.. ..	186–190
..	10	Hampton Court . .	10 0 0	10 0 0	15–16
7800	10	Hong Kong (Lim.)	10 0 0	10 0 0	14½–15½
5000	10	Hornsey	10 0 0	10 0 0	15–16
2000000/.	100	Imperl. Continental	100 0 0	10p.c.& 2 p.c.	178–180 bonus
..	..	Kingston	..	.. ..	..
..	20	Lea Bridge	..	7 0 0	11½–12½
6100/.	100	Liverpool United .	100 0 0	10 0 0	180–185
19100/.	100	Do., B	100 0 0	7 0 0	125–135
3865001.	Sk.	London	100 0 0	10 0 0	175–178
150000/.	Sk.	Do., 1st pref. . .	100 0 0	6 0 0	123–126
7622	25	Do., A shares . .	25 0 0	6 0 0	29–31
26692/.	Sk.	Do., Debent. stk.	100 0 0	5l. & 6l.	..
15000	5	Malta and Mediterranean (Limited).	5 0 0	2 10 0	2–2½
6000	5	Do., preference .	5 0 0	7 10 0	5–5½
20000	5	Mauritius (Limited)	2 5 0	1 0 0	1¾–1¼ dis
25000	20	Monte Video (Lim.)	20 0 0	6 0 0	13¼–14
8000	10	Nietheroy, Brazil (Limited)	10 0 0	5 0 0	3½–4½
30000	5	Oriental (Calcutta).	5 0 0	9 0 0	7–7½
30000	5	Do., new shares .	3 10 0	9 0 0	1¼–1¾ pm.
10000	5	Ottoman (Limited).	5 0 0	3 0 0	2–2½
10000	10	Parà (Limited) . .	10 0 0	4 10 0	5¾–6¼
27000	20	Phœnix	20 0 0	10 0 0	35–37
3600000/.	100	Do., new max. 7½	90 0 0	7 10 0	115–20
1440000/.	Sk.	Do., capitalized .	100 0 0	5 0 0	87–92
..	20	Do., new, 1876. .	16 0 0	10 0 0	15–17pm
..	10	Richmond (Surrey)	10 0 0	10 0 0	16–17
37500	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	25–27
1500	32½	Shanghai	32 10 0	12 0 0	.. [pm
135000	100	Sheffield, A	100 0 0	10 0 0	197–198
99700	100	Do., C	100 0 0	10 0 0	195–197
615600	100	Chelsea	100 0 0	6 10 0	206–209
1624700	100	East London . . .	100 0 0	6 10 0	214–217
10798	50	Grand Junction .	50 0 0	5 0 0	120–122
5840	25	Do., ¼ shares . .	25 0 0	5 0 0	59–61
6160	25	Do., new ditto; max. div., 7½ p.c.	25 0 0	5 0 0	44–48
5551801.	100	Kent	100 0 0	8 0 0	285–290
781800/.	100	Lambeth	100 0 0	6 10 0	206–209
326150/.	100	Do., max., 7½ p.c.	100 0 0	6 10 0	180–185
442	100	New River	100 0 0	10 3 8	388–392
4475	100	Do.	85 0 0	10 3 8	280–300
400000	100	Do., deb. sk., 4 p.c.	100 0 0	4 0 0	101–103
666800/.	100	Southwrk & Vauxh.	100 0 0	6 0 0	225–228
324700/.	100	Do., pref. stock .	100 0 0	5 0 0	127–129
126500/.	100	Do., D shares. .	100 0 0	6 0 0	174–178
70000/.	100	Do., new ordnry.	.. ..	4 10 0	.. ..
1600	100	Do., nw. ord. No. 1	40 0 0	4 10 0	.. ..
15073	61	West Middlesex .	61 0 0	6l. p.sh.	179–182
	£	Gas Companies.	£ s. d	£ s. d	£
12500	5	Singapore (Lim.) .	5 0 0	7 10 0	5⅞–6
2000	5	Do., preference.	5 0 0	7 10 0	5¾–6¼
500000	Sk.	South Metropoltn.	100 0 0	11 10 0	196–202
..	5	Do., "B"	100 0 0	10 0 0	180–185
..	5	Tottenham & Edmonton	5 0 0	10 0 0	8¼–8⅞
1500	10	Wandsw. & Putney	10 0 0	10 0 0	14½–15
1500	10	Do.	10 0 0	7 10 0	12¾–13½
4000	10	Do.	10 0 0	7 0 0	11½–12
26000	5	West Ham	5 0 0	10 0 0	8½–9½
..	10	West Kent	10 0 0	10 0 0	14–16
2400	5	Woolwich, Plmstd. and Charlton . .	5 0 0	16 0 0	9–10
		Water Companies.			
100	100	Chelsea	100 0 0	6 10 0	206–209
100	100	East London . . .	100 0 0	6 10 0	214–217
50	100	Grand Junction .	50 0 0	5 0 0	120–122
25	25	Do., ¼ shares . .	25 0 0	5 0 0	59–61
25	25	Do., new ditto; max. div., 7½ p.c.	25 0 0	5 0 0	44–48
100	100	Kent	100 0 0	8 0 0	285–290
100	100	Lambeth	100 0 0	6 10 0	206–209
100	100	Do., max., 7½ p.c.	100 0 0	6 10 0	180–185
100	100	New River	100 0 0	10 3 8	388–392
100	100	Do.	85 0 0	10 3 8	280–300
100	100	Do., deb. sk., 4 p.c.	100 0 0	4 0 0	101–103
100	100	Southwrk & Vauxh.	100 0 0	6 0 0	225–228
100	100	Do., pref. stock .	100 0 0	5 0 0	127–129
100	100	Do., D shares. .	100 0 0	6 0 0	174–178
..	..	Do., new ordnry.	.. ..	4 10 0	.. ..
40	100	Do., nw. ord. No. 1	40 0 0	4 10 0	.. ..
61	61	West Middlesex .	61 0 0	6l. p.sh.	179–182

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

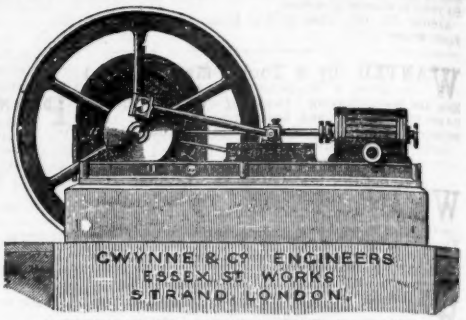
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

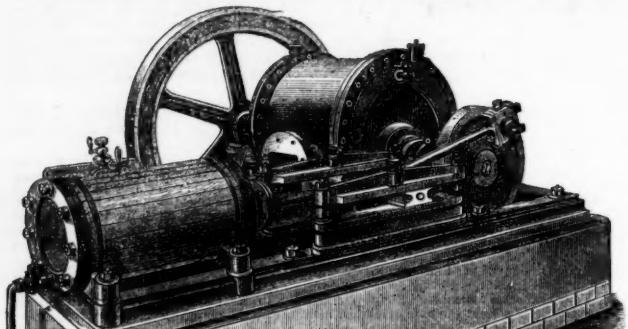
GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, **GWYNNE & CO.**, Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,



WITH

Wrought-Iron Spindles and

ENGINES COMBINED.

SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

[*SEE ALSO ADVERTISEMENT, PAGE* 342.]

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

Now Ready, Price One Guinea,

PRECEDENTS IN PRIVATE BILL LEGISLATION

AFFECTING GAS AND WATER UNDERTAKINGS.

COMPILED BY MR. G. W. STEVENSON, C.E., F.G.S.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

LIVESEY'S PATENT WASHER.

This apparatus effects the most intimate contact between the liquor with which it is supplied and the gas passing through it, resulting in the complete removal of all particles of tar, increasing the ammonia strength of the scrubber and condenser liquor, and removing a large proportion of other impurities—notably, carbonic acid. The Washer is intended to work in conjunction with a scrubber. It occupies little space, and is inexpensive. It does not become clogged with tar or corroded by the action of the liquor or gases, it gives three inches of pressure, and only needs a supply of liquor to keep it in regular action without any further attention. It has been in constant successful use for five years and is now in operation in upwards of fifty places.

For Particulars and Prices apply to

Messrs. DEMPSTER AND SONS, ELLAND, HALIFAX, for the North;
Messrs. BAILEY, PEGG, AND CO., Bankside, LONDON, S.E., for the South;
Messrs. WILLEY AND CO., Commercial Road, EXETER, for West of England and South Wales;
Or to the PATENTEE, 589, OLD KENT ROAD, LONDON, S.E.

WANTED, Readers of the NEW Edition, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WANTED, by the Advertiser, a Situation as GAS MANAGER in a Works making from 15 to 30 millions. Good testimonials and references. Six years in present situation.
Address No. 635, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Young Man (a total abstainer) a situation as IMPROVER to the Main and Service Laying. Is used to a Gas-Works, being the son of a Manager, and has also had several years experience in an Engineer's Shop, both at Lathe and Vice.
Apply to A. THOMAS, BASINGSTOKE.

TO GAS-FITTERS.

WANTED immediately, a competent steady Man as GAS-FITTER. Must understand Gas-Fitting, Laying Mains, Taking Meters, and Smithing. Wages 28s. a week.
Apply, with references, to Mr. GEO. WEAVER, Secretary, Gas Company, LEOMINSTER.

WANTED, by an Energetic Man, aged 36 years, a Re-engagement as ENGINEER and MANAGER, or as Secretary and Manager, or Assistant, in a large town. Is conversant with all matters appertaining to Manufacture and Distribution, can Make Plans, &c. Is a first-class Carbonizer. Excellent testimonials.
Address No. 634, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ACKWORTH AND FEATHERSTONE GAS COMPANY.

WANTED, two Second-hand Purifiers, from 6 ft. to 8 ft. square, with Wood Sieves, Covers, and Lifting Gear complete; also dry Centre Valve for four Purifiers. The whole to be in good working order.
Particulars as to price, &c., to be sent to WILLIAM OLDFIELD, Gas Manager, Purston, near Pontefract.

THE NORTHWICH GASLIGHT AND COKE COMPANY, LIMITED.

WANTED, a Gas Manager. Make 20 millions. Salary £100 per year, with house, coal, gas, water, rates, and taxes free.
Applications, stating age, &c., to be sent in not later than Saturday, March 6, 1880, addressed to the Chairman, sealed and endorsed "Gas Manager."
HENRY PICKERING, Secretary.
Northwich, Feb. 14, 1880.

TAR PRODUCTS.

MANAGER Wanted, Efficient in the Sale of TAR, and with practical Knowledge of Tar-Distilling preferred.
Address G 61, care of HENRY GREENWOOD, 2, York Street, Covent Garden, LONDON, W.C.

TAR DISTILLERS.

A Practical Man desires an Engagement as MANAGER or SUB-MANAGER of Tar Distilling and its products.
Address No. 633, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Fleetwood Gas Company require a steady industrious Man as STOKER. Must be well up in Gas-Making, and thoroughly acquainted with the working of valves. Wages 28s. per week. To a suitable person constant employment will be found.
Apply at once to R. SHADBOLT, Manager, Gas-Works, FLEETWOOD.

GASHOLDER for Sale, 36 ft. by 12 ft., contains 12,000 cubic feet, with Columns and Girders complete.
Apply to the MANAGER, Gas-Works, CHERTSEY.

SLEAFORD GAS COMPANY, LIMITED.

FOR SALE—Single Gasholder, 32 ft. by 14 ft., Counter-balanced, Connections and all complete, in good condition. Reason for removal, ground wanted.
Particulars to be had of HARRY WIMHURST, Manager.

FOR SALE—A Set of Four Purifiers, each 18 ft. long by 8½ ft. wide, and 6 ft. deep, with Centre-Valve and 12-in. Connections complete.
Parted with as being too small.
Offers to be addressed to the MANAGER, Edinburgh and Leith Gas Company, Baltic Street, LEITH.

WATER-WORKS DEBENTURES TO PAY SEVEN PER CENT.

TO BE SOLD—Debentures in the Truro Water-Works Company, having about 3½ years further to run, at a price that will pay the buyer 7 per cent. The debentures constitute a first mortgage on the whole of the property of the Company and form part of a series of £4000, the only amount the Company is authorised to raise by their Act of Parliament.
Applications, by letter, to be made to No. 632, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

HINDLEY LOCAL BOARD.

ON SALE—One Gasholder, 50 ft. by 20 ft., with 6 Pillars, Counterbalance Weights, and Chains to each; wrought-iron Lattice Girders complete, with 8-in. Inlet and Outlet Connections. One Walker's patent 8-in. Valve on outlet. One cast-iron Syphon Pump on inlet. 226 ft. of 8-in. Gas Main Pipes, socket jointed. The whole of the best material, by Daniel Howard and Son, West Bromwich. Only in use six years. May be seen at Platt Bridge, Hindley.
Tenders to be sent in, addressed to the Chairman of the Gas Committee, Local Board Offices, Hindley, on or before Monday, March 15, 1880.
By order,
STEPHEN HOLT, Clerk.
Feb. 26, 1880.

HARROW DISTRICT GAS COMPANY.
NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of this Company will be held at the Guildhall Tavern, 1, Gresham Street, in the City of London, at One o'clock, on Wednesday, March 10, 1880, to receive the Directors and Auditors reports, to declare a Dividend, to elect a Director and Auditor, and to transact any other ordinary business of the Company.
The Transfer Books will be closed from the 3rd of March until after the meeting.
By order of the Board,
J. L. CHAPMAN, Secretary.
Office, Gas-Works, Harrow, Feb. 24, 1880.

TO CORPORATIONS, COMPANIES, AND OTHERS.

PLANT Erected for Working Nitro-genous Matters, such as Night Soil, Sewerage, Hair Waste, &c., into Ammoniacal Liquor, Liquor Ammonia, Sulphate of Ammonia, and Residuals; or plans and specifications supplied. Price on application. Also Working Models of above apparatus sent c.o.d., carriage paid, price £8 8s.
Address JOHN G. HARVEY, Milnsbridge, HUDDERSFIELD.

NOTICE TO MANAGERS OF GAS COMPANIES.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to
FRANK M'GEDY, Secretary.
126, Chancery Lane, London.

BOROUGH OF OVER DARWEN.

THE Gas Committee of the above Cor-poration are prepared to receive TENDERS for the Supply of 112 RETORTS, and the necessary Bricks, Tiles, &c., for setting same.
Specifications and forms of tender may be had from the undersigned, and tenders, endorsed "Tender for Retorts," to be delivered to C. Costeker, Esq., Town Clerk, Darwen, on or before Tuesday, March 16, 1880.
THOS. DUXBURY, Manager.

AMMONIACAL LIQUOR.

THE Best Continuous Method for Work-ing Large or Small Quantities of Liquor. This is an improvement on what is known as the "Coffey Still Process." The result in sulphate of ammonia is very large, nearly every atom of ammonia gas being driven out of the liquor before it is liberated, also a saving in acid. Small Working Models to work about 5 gallons per day, with steam boiler and every requisite, sent c.o.d., carriage paid, price £4 4s.
Address JOHN G. HARVEY, Milnsbridge, HUDDERSFIELD.

GASHOLDER FOR SALE.

THE Forfar Gas Corporation have for SALE a Single-Lift GASHOLDER, 60 ft. diameter by 18 ft. deep, with six tripod Columns and wrought-iron Girders, now in working, but must be removed between the 1st and 31st of May next.
Further particulars on application to the Manager at the Works.
Tenders received by Mr. WILLIAM GORDON, Solicitor, Clerk to the Commissioners, on or before March 31, 1880.
Forfar, Feb. 11, 1880.

THE Ossett Gas Company require the services of an efficient GAS MANAGER to undertake the entire Superintendence of the Works. He must thoroughly understand the Manufacture, Distribution, and Testing of Gas. Annual make about 40 millions. House, gas, and coal free.
Applications, in writing, with full particulars as to practical experience, &c., to be sent in, with testimonials, addressed to the Chairman of the Company, not later than the 16th day of March inst.
Gas Office, Ossett, near Wakefield, March 1.

THE Sunbury-on-Thames Gas Company have FOR SALE the following PLANT, in good condition, thrown out to give place to larger:—
Two Purifiers, 5 ft. by 3 ft. by 3 ft. deep.
Six-inch Connections with Lifting Screw and Traveller complete.
Three 6-in. Cathels's patent Four-way Valves.
Station-Meter to pass 1500 feet per hour, 4-in. Connections.
Five-inch Condenser, nine Pipes, and Tar Box with Overflow Pipe.
Six 6-in. Donkin's Valves.
For particulars and price apply to Mr. JOHN SMITH, Manager, Gas-Works, Sunbury-on-Thames. MIDDLESEX.

TO PIPE LAYERS.

THE Water and Gas Committee of the Bangor Local Board of Health are prepared to receive TENDERS from competent persons for Excavating, Reinstating, Laying, and Jointing 6-in. GAS-PIPES, &c.
Specification may be seen and forms of tender obtained on application to the undersigned, at the Water and Gas Offices, Bangor, Carnarvonshire.
Sealed tenders, marked "Tenders for Laying Gas-Pipes," to be addressed to the Chairman, the Water and Gas Committee, Bangor, Carnarvonshire, on or before the 12th of March next.
The Committee do not bind themselves to accept the lowest or any tender.
DAVID WHITE, Secretary and Manager.
The Water and Gas Works, Bangor, Feb. 28, 1880.

HAGUE WATER-WORKS.

THE BURGOMASTER & ALDERMEN of the Hague (Holland) are prepared to receive competitive TENDERS for the Supply, Erection, and Maintenance, during one year, of a PUMPING-ENGINE and other Apparatus belonging thereto for service of the Hague Water-Works. By the 1st of April, 1880, plans and are to be sent in, franco, to the address of the Burgomaster and Aldermen, the Hague.
The specifications and explanatory drawings can be obtained from the Engineer of the said Water-Works per Post-Office Order for 4s. 2d., and post paid; or information can be had at the Engineer's Office on Mondays and Fridays, between Two and Four o'clock.

NOW READY.
Will be sent post free, on receipt of 4s. in stamps,

THIRD EDITION, "Improvements in Gas Apparatus." By GEORGE ANDERSON.
With 22 Illustrations of Retorts, Purifiers, &c., &c.
Re-written and enlarged, with a chapter on the "Purification of Gas," by Mr. R. H. PATTERSON, late Metropolitan Gas Referee.
To be had of WALTER KING, "JOURNAL OF GAS LIGHTING" Office, 11, Bolt Court, FLEET STREET, E.C.; or of the Author, 35A, Great George Street, WESTMINSTER.

TO BUILDERS AND CONTRACTORS.

THE Directors of the Wakefield Gas-light Company are prepared to receive TENDERS for the Excavation and Building of a TANK for a Gasholder, on the Company's premises.
Plans and specifications may be seen at the Company's Office in Warrengate, on Tuesday, the 2nd of March next, and every day during the same week.
Tenders to be sent in on or before the 13th of March next, addressed to the Chairman of the Gaslight Company, Wakefield (Tender for Tank).
The lowest or any tender not necessarily accepted. No allowance for tenders.
By order,
JOHN W. WHITAKER, Manager and Secretary.
Gas Office, Warrengate, Feb. 27, 1880.

CORPORATION OF LEICESTER—GAS DEPARTMENT.

EXHIBITION OF GAS-ENGINES, COOKING-STOVES, BURNERS, AND OTHER APPARATUS.

THE Gas Committee of the Corporation of Leicester intend holding, from the 12th to the 17th of April next, an EXHIBITION of all kinds of Apparatus or Appliances showing the Advantages and Economical Uses of Gas for Engine, Cooking, Domestic, and other purposes. They will provide space, gas, and connections free, and give Certificates of Merit.
Intending Exhibitors will be furnished with printed conditions, forms for allotment of space, and any further information, on application to
G. A. AND C. S. ROBINSON, Managers.
Gas Offices, Millstone Lane, Jan. 23, 1880.

TO TAR DISTILLERS, MANUFACTURERS, AND OTHERS.

THE Directors of the Phœnix Gaslight and Coke Company are prepared to receive TENDERS for the purchase of TAR made at their respective stations at Vauxhall, Bankside, and Greenwich, for the period of One year, from the 1st of April ensuing. The quantities will be approximately—Vauxhall, 1,500,000 gallons; Bankside, 300,000 gallons; and Greenwich, 500,000 gallons in the twelve months; total, 2,300,000 gallons. Tenders may be made for one, two, or more of the stations.
Forms of tender and conditions of contract may be had upon application to the Secretary, 70, Bankside. Tenders, to be endorsed "Tenders for Tar," to be delivered at this Office on or before Wednesday, the 10th of March, at One o'clock p.m.
The Board do not bind themselves to accept the highest or any tender.
By order of the Court of Directors,
ISAAC ADOLPHUS CROOKENDEN, Secretary.
70, Bankside, S.E., Feb. 26, 1880.

GAS PLANT FOR SALE.

THE Coventry Gas Company have for Sale—
SCRUBBERS.—One 5 ft. 6 in. diameter, 20 ft. high. One 5 ft. 6 in. diameter, 15 ft. high. One 5 ft. diameter, 20 ft. high; with or without 8-in. Connections and Valves.
METER.—One 12,000 feet per hour (Parkinson's make), 8-in. Connections and Valves.
GASHOLDER.—One Telescope, 40 ft. diameter and 34 ft. high, in two lifts; Cast-iron Tank for same, 41 ft. 6 in. diameter, 18 ft. high.
STEAM-JET VENTILATOR.—One No. 2 Körting's Patent Jet Ventilator, with Chest. One No. 3½ Körting's Patent Jet Blower.
VALVE.—One 12-in. Cathels's Four-way Valve.
The above are being replaced by large apparatus, and can be removed at once. Also a 100-light Gas Apparatus (Porter's make).
For particulars and prices apply to
W. L. ROBINSON, Manager.
Gas-Works, Coventry, Feb. 21, 1880.

TYLDESLEY-WITH-SHAKERLEY LOCAL BOARD NEW GAS-WORKS.

TENDERS are invited for the Supply and Erection of the following APPARATUS, viz.:—
Contract No. 2.—Iron Roof, Gutters, and Ornamental Castings.
" 3.—Retorts and Settings.
" 4.—Retort Fittings, and other Ironwork.
" 5.—Wrought-iron Mains and Condensers.
" 6.—Exhauster, Boiler, Fittings and Pumps.
" 7.—Washer, Scrubber, Staircase, &c.
" 8.—Purifiers.
" 9.—Gasholder.
" 10.—Station-Meter and Governors.
The plans and specifications may be seen at the Offices of the Local Board on application to the undersigned, to whom sealed tenders, endorsed with the number of each contract, are to be delivered not later than Friday, the 12th of March next.
AMOS CRAWSHAW.
Offices, No. 36, Elliott Street, Tyldesley, near Manchester, Feb. 26, 1880.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—

About 130 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. 28 Mouthpieces, D-shape, 16 in. by 20 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12 in. Slide-Valves and 12 in. Connections.

Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12 in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

Exhauster (Beales) to pass about 25,000 feet per hour.

Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

4-horse power Horizontal Steam-Engine.

Three 4-in. Pumps, with cranked Shafting and a pair Mitre Wheels.

Two Purifiers, 16 ft. by 8 ft., with six 12-in. Slide-Valves and 12-in. Connections.

Station-Meter by A. Wright and Co., London, with three 12-in. Slide-Valves, and 12-in. Bye-Pass and Connections, to pass about 25,000 feet per hour.

Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.

Gasholder, Double Lift, capacity 100,000 feet.

Gasholder, Double Lift, capacity 240,000 feet.

One 12-in. Governor, by Wright, London, with 12-in. Valves, Bye-Pass, and Connections.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned.

R. MORLAND, Engineer.

Price 5s., post free. Limp cloth.

ANALYSES of COALS & CANNELS,

MADE FROM BULK.

By ROBT. I. TOOTILL,

COAL AND CANNEL ANALYST AND PRACTICAL GAS CHEMIST.

LONDON:

WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

Now ready, price 18s., bound in cloth, gilt lettered,

THE THIRTY-FOURTH VOLUME

(JULY to DECEMBER, 1879,)

OF THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, AND SANITARY IMPROVEMENT.

CLOTH CASES, GILT LETTERED,
For binding Vol. XXXIV., may be obtained,
PRICE . . . 2s. 6d.

LONDON:

WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,

SCOTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

GAS COAL.

THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete Analysis, on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.

Mr. James Paterson, C.E., F.G.S., in his analysis of T. V. Arley Coal, says: "Some parts merge into a semi-Cannel; gas per ton, 10,300 cubic feet; illuminating power, 16·96 candles; coke of high quality, 1431 lbs. per ton."

Collieries, Skelmersdale, near Ormskirk; Offices, 5, New Hall, Old Hall Street, LIVERPOOL.

THE

IMPERIAL METER CO.,

LIMITED,

Makers of THE IMPROVED DRY GAS-METERS, THE PATENT WET GAS-METERS, Special Meters for Public Lighting, STATION-METERS, Governors, &c.

KING'S ROAD, ST. PANCRAS.

Formerly also (Walter Ford) at Gray's Inn Road.

S. PONTIFEX & CO.,

GAS AND WATER ENGINEERS,

22, COLEMAN STREET, LONDON, E.C.,

Supply and Erect Street Lamp Columns, together with Head Irons and Lanterns, as well as all the other fittings connected therewith.

S. P. & Co. also contract with Gas, Railway, and other Companies, Local Boards, and Vestries, for the maintenance and repair of Lamps and Fittings.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

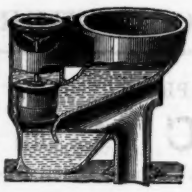
EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.



SMEATON'S TRAPLESS CLOSETS.

MESSRS. W. SMEATON & SONS,

HOT WATER AND SANITARY ENGINEERS.

PATENTEES AND INVENTORS OF THE
TRAPLESS, THE D TRAP, AND EDDYSTONE CLOSETS.

Also the New

ECLIPSE COMBINATION CAST LEAD TRAP,

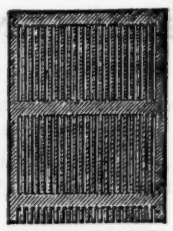
The Price will be half of the old-fashioned D Trap, it being cast all in lead, without a Joint. Send at once for an Illustrated Price List to their Wholesale and Retail Agent,

G. R. GLENIE,

WALBROOK HOUSE, 37, WALBROOK, LONDON, E.C.

A large Discount to the Trade and Shippers. Estimates Given and Contracts Taken.

R. DEMPSTER AND SON'S



WOOD SIEVES FOR PURIFIERS,

WITH TAPER OR PARALLEL BARS,

MADE BY SPECIAL MACHINERY.

SCRUBBERS FILLED WITH BOARDS,

On our approved principle, for the extraction of Ammonia.

Prices on application. References to First-Class Engineers.

ROSE MOUNT IRON-WORKS,

ELLAND, NEAR HALIFAX.

LONDON OFFICES: 2, SUFFOLK LANE, CANNON STREET, E.C.

Now ready, Second Edition, price 7s., by post 7s. 3d., the

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, M.I.C.E.

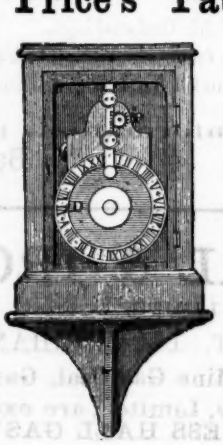
Orders to be sent to

WALTER KING,

11, BOLT COURT, FLEET STREET, LONDON, E.C.

Price's Patent Lamplighters Tell-Tale,

OR TIME RECORDER.



This Instrument has been invented particularly for recording the hours of starting and return of Lamplighters from the Works, or any office, for the discharge of the duties of lighting and extinguishing Public Lamps; but it is also applicable to any establishment in which it is desired to obtain an unfailing record of the attendance or non-attendance of men at their posts at certain periods. Irregularity in the time of lighting Public Lamps leads to complaints, while neglect in extinguishing at the proper hour causes loss to Gas Companies, or where the average meter system is in use, an excess of expenditure on the part of Local Authorities.

SOLE MANUFACTURERS,

ALEXANDER WRIGHT & CO.,

55, 55a, and 56, MILLBANK STREET, LONDON, S.W.

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

J. E. WILLIAMS & CO.,

SOLE MANUFACTURERS OF THE

SPECIAL METALLIC OXIDE PAINT,

Largely used by Gas Companies, Corporations, Railway Companies, Ironfounders, and Machinists.

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

It has the following qualifications and properties:—

Effectually prevents and arrests corrosion.
Has a fine gloss, and is very durable.
Does not require driers like other paints.
Protects iron from action of water.

Is not affected by sulphuretted hydrogen.
Forms a very hard, tough (not brittle) surface.
Will not crack, blister, or scale.
Is not affected by extremes of temperature.

Covers nearly double the area of other paints. (7 gallons or 1 cwt. will cover 1211 square yards of ironwork.)
Is cheaper and more economical than any other.

VICTORIA PAINT WORKS, COLLYHURST, MANCHESTER.

ECONOMY IN THE PRODUCTION OF GAS.

PLUTONIC CEMENT,

FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.

A Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,

WILLIAM RICHARDSON, Gas and Hydraulic Engineer, CHARLES HENRY STREET, and BISSELL STREET, BIRMINGHAM.

THE

GAS & WATER ENGINEERS BOOK OF REFERENCE.

BY

GEO. BOWER, ST. NEOTS, HUNTINGDONSHIRE.

SECOND EDITION.

The first Edition of the *Gas Engineers Book of Reference* was published fourteen years ago, and it has long since been out of print. The present Edition has been almost entirely re-written, and it may be considered a business Treatise on Practical Gas Engineering, and there is, besides, a section devoted to Heating by Hot Water Circulation.

There are articles upon each branch of Gas Manufacture, together with Specifications, Memoranda, Rules, and Information useful to Engineers.

Price of the Book, 4s.; of the Companion, with Detailed Costs, 1s.

FREE POST IN ENGLAND ON RECEIPT OF P.O.O.

COMPTOIR GÉNÉRAL D'USINES À GAZ ET CONDUITES D'EAUX.

Offices: 55, RUE CONDORCET, PARIS.

The Comptoir Général of Gas and Water Works is specially established for the Buying and Selling, on Commission, of existing Works and Concessions.

The Comptoir Général is at present authorized by leading Companies and Bankers to Buy Gas and Water Works and Concessions.

The Comptoir Général guarantees Capital for *bonâ fide* Undertakings.

The Comptoir Général undertakes to act as Agents for eminent Engineers and Contractors and Colliery Proprietors.

The Comptoir Général has negotiated for and concluded business to the amount of One Million Sterling in one year.

For further Information, apply to

Baron MOSER DULFUS,
Directeur-Gérant.

55, Rue Condorcet,
Paris, Feb., 1880.

THE WIGAN COAL & IRON COMPANY,

LIMITED,

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

WILLIAM SUGG'S
CELEBRATED PATENT GAS-BURNERS.

An entirely New Pattern of the well-known Patent Christiania Flat-Flame Governor Burner,

THE "PRINCESS CHRISTIANIA,"

With Various Pattern Burners and Shades, Plain White and Hand-Painted in Several Styles of Decoration, Fern Leaves, Flowers, Birds, &c.

PLAIN WHITE.

See that all Burners and Shades bear the Trade Mark,

without which None are Genuine.

MAIDENHAIR PATTERN.

COLOURED ILLUSTRATIONS, PHOTOS, & PRICES ON APPLICATION.

WILLIAM SUGG respectfully invites the attention of the Gas Trade generally to this New Pattern, second to none in elegance of appearance, and unanimously pronounced

"THE PERFECTION OF A FLAT-FLAME BURNER."

With 5 Cubic Feet per Hour of Gas which gives a Light equal to 14·3 Parliamentary Sperm Candles

(As tested by the Sugg-Letheby Parliamentary Standard Burner),

THE ORDINARY FISHTAIL & BAT'S-WING BURNERS

GIVE ONLY A LIGHT EQUAL TO

FROM SIX TO EIGHT SPERM CANDLES;

WHILE

THE PATENT CHRISTIANIA FLAT-FLAME BURNER,

With Self-Acting Governor for maintaining Uniformity of Pressure, consuming 5 Cubic Feet of Gas per Hour,

GIVES A LIGHT EQUAL TO

SIXTEEN SPERM CANDLES,

Or 100 PER CENT. more Light for the same Quantity of Gas consumed.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

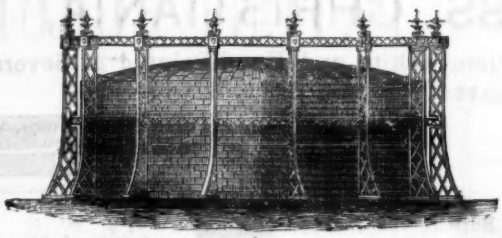
BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS, WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

8, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

HYDRAULIC, GAS, AND GENERAL ENGINEERS,

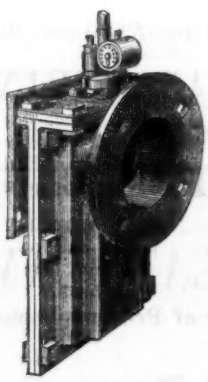
WHITEFRIARS STREET, LONDON, E.C.

Sole Manufacturers of MANN & OWENS'

PATENT SCREW & CAM GAS-VALVE,

Protected by Royal Letters Patent in England, France, Belgium, & the United States of America.

VALVE to OPEN DOWNWARDS.



BRIDGE-VALVE
for Regulating the Seal of Hydraulic Mains.

VALVE to OPEN UPWARDS.

The SPECIAL ADVANTAGES of MANN AND OWENS' PATENT VALVE are as follows:—

1. Its non-liability to become set fast through varying temperature or from the deposit from crude gas. 2. It is made absolutely gas-tight by the simple action of a screw and cam. 3. Inconvenience through the breakage of springs or wedges setting fast cannot arise. 4. The face of the Valve is scraped and cleaned of any solid matter at each operation of opening or closing.

The Valve can be had to work either in a Vertical or Horizontal position.

Every Valve is carefully tested under pressure, and warranted perfectly sound and gas-tight.

INSTRUCTIONS FOR ORDERING.

State whether required for above or below ground, if Double Flange or Socket and Spigot Valves are wanted, or with loose Flanged Socket and Spigot pieces.

The Prices include Indicators to show extent to which Valve is open.

Also makers of PILLAR-VALVES, SELF-ACTING BYE-PASS VALVES, OUTSIDE RACK AND PINION VALVES, HYDRAULIC-MAIN VALVES, DISC-VALVES, &c.

Every description of Pumping Apparatus, Hydraulic Lifts, &c., suitable for use in Gas-Works, made to order.

PRICES, SIZES, AND FULL PARTICULARS, WITH COMPLETE ILLUSTRATED CATALOGUE, FURNISHED ON APPLICATION.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

MECHANICAL AND CONSULTING GAS ENGINEER,

NORWOOD, NORTHENDEN ROAD,

SALE, NEAR MANCHESTER.

SANDELL AND SON,

PUBLIC ACCOUNTANTS,

2, GREAT GEORGE STREET, WESTMINSTER.

SANDELL AND SON having been engaged during the past 25 years in Gas Companies Accounts, either in Preparing or Investigating Statements for Parliamentary Applications, Arbitrations, and otherwise, offer with confidence their Services for similar purposes.

Mr. ROBERT DEMPSTER,

CONSULTING GAS ENGINEER,

ELLAND, near HALIFAX,

May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations is both extensive and reliable.

ALFRED LASS, F.I.Accts.,

SPECIAL ACCOUNTANT FOR GAS AND WATER UNDERTAKINGS,

30, GRACECHURCH STREET, LONDON.

Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

HARPER & MOORES,

PROPRIETORS OF THE

BEST STOURBRIDGE CLAYS,

STOURBRIDGE.

Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

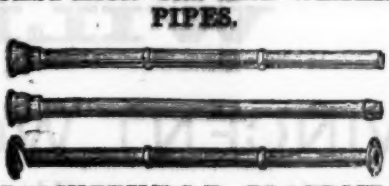
NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

GAS AND WATER PIPES.

WILLIAM MACLEOD & CO.,

30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B., GLASGOW.

Prices on application.

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS.

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

LONDONDERRY GAS COALS

DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES.

COUNTY OF DURHAM.

For Prices and Particulars, apply to

MR. S. J. DITCHFIELD,

LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.

London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

W. PARKINSON & CO.,

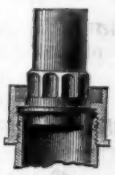
SOLE AGENTS FOR AND MANUFACTURERS OF

FOULGER'S PATENT SEAL UNIONS,

As Supplied to The Gaslight and Coke, Commercial, South Metropolitan, and other Companies.

These Unions practically place a Gas Company's property under lock and key, by rendering it impossible to disconnect at any joint at which gas can be obtained unregistered, without destroying the Company's Seal.

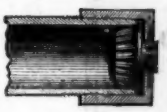
In fixing the Union (one being required on the main cock and another on the inlet only), some molten sealing-wax is poured into the recess on cap, and whilst hot impressed with Foulger's patent tong-shaped die, having the Gas Company's title engraved thereon; the wax being forced into the flutings on the lining, instant destruction of the Seal accompanies any attempt at disconnection.



SECTION.

FOULGER'S PATENT SEAL CUTTING-OFF CAPS

Cannot be taken off without destroying the Company's Seal. A tapered fluted plug (having been white-leaded or puttied) is inserted in the service-pipe. The cap (already filled with sealing-wax) is then screwed over, and tightens on a washer on the flange of plug. The wax is then warmed, and stamped with the engraved die. Absolute security against fraud and escape is thus obtained.

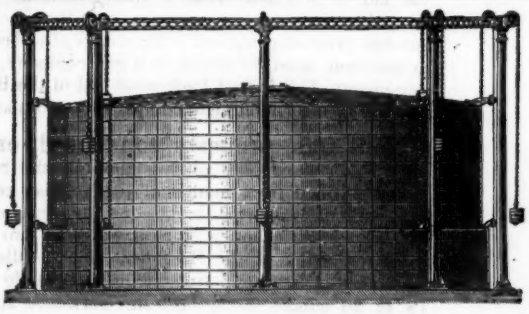


SECTION.

A great advantage will also be recognized in stopping the gas instantly with the plug, and consequent immunity from the present source of danger occasioned by escape during fitting the ordinary cap, frequently in a confined position, and often occupying a considerable time.

Small additional cost over existing connections.

COTTAGE LANE, CITY ROAD, LONDON, E.C.



J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

GEORGE'S

Patent Gas Calorigen,

A STOVE FOR

WARMING AND VENTILATING.

RECOMMENDED BY DR. RICHARDSON.

MANUFACTURERS:

J. F. FARWIG & CO.,

36, QUEEN STREET, CANNON ST., LONDON.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY,

and every Article suitable for

GAS AND WATER WORKS.

TUBES

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

13,830 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 13,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,220 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSON AND Co., 21, Lime Street, LONDON, E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

THE

SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

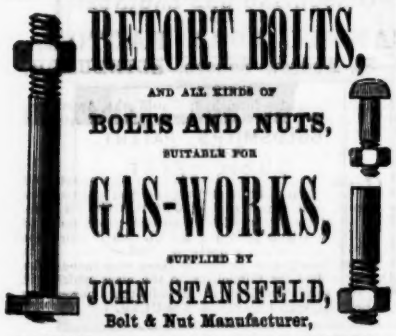
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.



RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.

FERRAND DAVIES,

146, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, will be sent, post free, on receipt of 4s. in stamps To be had of the AUTHOR; or at the Office of the "JOURNAL OF GAS LIGHTING."

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

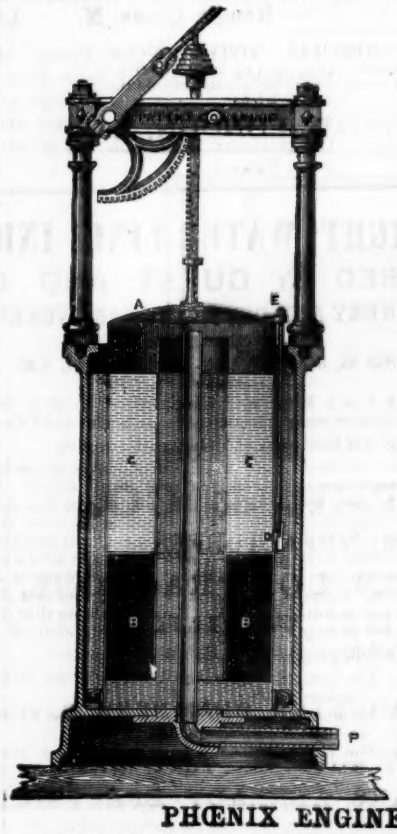
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

GEORGE WALLER & CO.,

GAS AND HYDRAULIC ENGINEERS,

Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



This is the most efficient and perfect Governor yet made to control and regulate the speed of Engines and Exhausters according to the varying make of gas, and maintain a steady gauge, whether working level or with six inches of seal.

It is the only Governor that will effectually control Condensing and Compound Engines, especially when the Exhauster is on light work, and the Engine is large.

During the drawing and charging of Retorts, the Engine requires no attention—a matter of great importance in small works.

Descriptive Circular sent on application.

They are in use at

BECKTON,
HAMPTON WICK,
DUKINFIELD,
HARTLEPOOL,
NEWCASTLE-ON-TYNE,
RAMSGATE,
SUTTON,

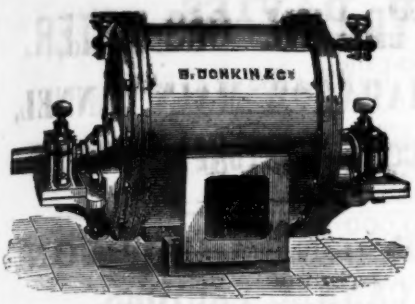
and about 30 other works.

G. W. and Co. make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

See also advertisement, page 334.

PHŒNIX ENGINEERING WORKS,

Holland Street and Bear Gardens, Southwark, S.E.



NEW PATENT GAS-EXHAUSTERS.

[J. BEALE'S.]

MESSRS. B. DONKIN & Co. possess the sole right to manufacture these Exhausters.

MADE WITH TWO OUTSIDE BEARINGS AND LATEST IMPROVEMENTS.

ALSO MANUFACTURERS OF

IMPROVED GAS AND WATER VALVES, STEAM-ENGINES, &c., &c.

B. DONKIN & Co., BERMONDSEY, LONDON.

GRINDROD'S PATENT PORTABLE PIPE-SCREWING MACHINES
A. PORTABLE £ 10 0
F. PILLAR 10 10 0
C. BENCH 8 8 0
ALL FOR
& 2 INCH PIPES
BAILEY'S SCREWING TACKLE BOOK, POST FREE

BAILEY'S FLY WHEEL STEAM PUMPS
SIMPLE & STRONG.
WITH NO MYSTERIOUS VALVES.
W. H. BAILEY & Co. HYDRAULIC ENGINEERS
ALBION WORKS, SALFORD, MANCHESTER.

Prices of Bailey's Double-Acting Steam-Pumps.

No.	Diameter of Steam Cylinder.	Diameter of Pump.	Length of Stroke.	Gallons pr. Hour. Approx.	Price.
	Inches.	Inches.	Inches.	At Slow Speed.	£
A 1	4	2	6	850	18
B 2	6	3	10	1,940	25
C 3	6	4	10	2,000	30
D 4	8	4	10	3,150	40
E 5	6	6	10	7,200	40
F 6	8	6	10	7,200	50
G 7	10	6	12	7,200	60
H 8	8	8	10	14,000	65
I 9	10	8	12	14,000	75
K 10	12	8	15	14,600	90
	10	10	15	21,000	110
	12	10	15	21,000	125

NOTE.—*At quick speed these pumps will generally deliver double the quantity specified.*

BAILEY'S HOT-AIR ENGINES,

From ¼-horse to 4-horse Power. Particulars on application. We also make Hot-Air Pumping Engines, and every description of Hydraulic Work.

W. H. BAILEY & CO., ALBION WORKS, SALFORD, MANCHESTER.

PARIS EXHIBITION, 1878.

THREE MEDALS

AND

HONOURABLE MENTION

HAVE BEEN AWARDED TO

JOSEPH CLIFF & SONS

For their Various Exhibits, amongst which is a

SILVER MEDAL

FOR THEIR

PATENT MACHINE-MADE

RETORTS AND FIRE-BRICKS,

Being the Highest Honour given for this class.

Established

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

London Wharf: No. 4. inside Great Northern Goods Station, King's Cross, N. Liverpool: Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

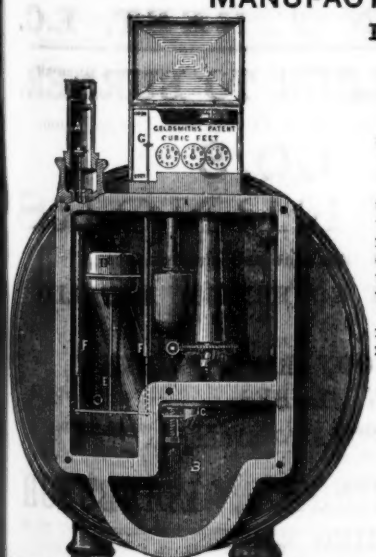


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

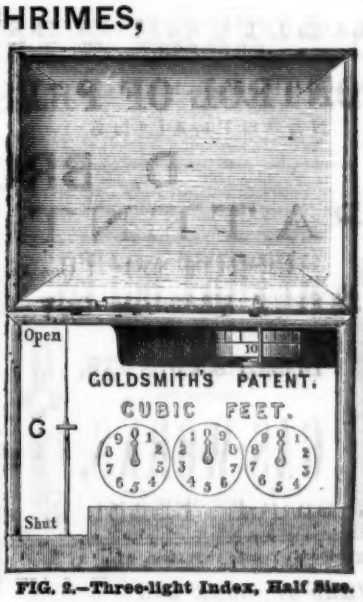
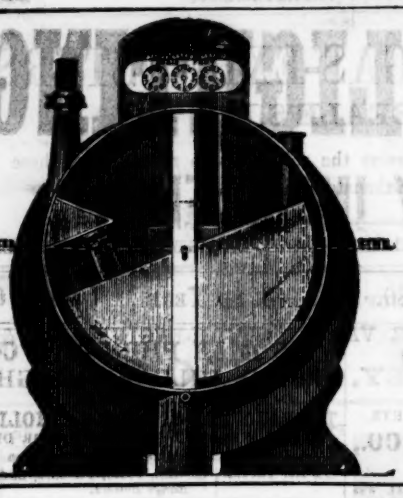


FIG. 2.—Three-light Index, Half Size.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."—THOS. G. BARLOW, C.E.

Over 120,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY, LIMITED,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

ALEXANDER WRIGHT & CO.'S

STANDARD LETHEBY PHOTOMETERS, &c.,

As made for the LONDON GASLIGHT COMPANY, and for many Provincial Corporations and Gas Companies, is the most Compact and Convenient Apparatus extant—sent out complete with Connecting Pipes. A. W. & Co.'s Photometric Apparatus has received the approval of the GAS REFEREES, AND IS USED BY THEM AT THEIR OFFICES.

ALL INSTRUMENTS REQUIRED FOR THE DETERMINATION OF THE QUALITY & PURITY OF COAL GAS.

LISTS ON APPLICATION.

55, 55a, & 56, MILLBANK STREET, LONDON, S.W.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW.

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges, Governors, Test Holders, &c., &c.

LONDON OFFICE:

6, LITTLE BUSH LANE, CANNON STREET, E.C.

CONTROL OF PRESSURE FROM GASHOLDER TO BURNER.

D. BRUCE PEEBLES & CO.'S

PATENT GAS GOVERNORS

Place in the hands of Gas Engineers the means of controlling Pressure in all situations and circumstances.

SAFETY STATION GOVERNORS, METALLIC DRY DISTRICT GOVERNORS, METALLIC NEEDLE LAMP GOVERNORS.

CONSUMERS GOVERNORS AND DOMESTIC NEEDLE-GOVERNOR BURNERS, WITH GLOBE HOLDERS AND CORNELIAN GLOBES.

WET AND DRY GAS-METERS OF SUPERIOR EXCELLENCY, STATION-METERS, &c.

D. BRUCE PEEBLES & CO., TAY WORKS, BONNINGTON, EDINBURGH.

London: Printed by WALTER KING, for the Executors of the late WILLIAM BOUGHTON KING (at the office of Clayton and Co. 17, Bouverie Street, Fleet Street), and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, March 2, 1880.